

State of California  
California Environmental Protection Agency  
AIR RESOURCES BOARD

**APPENDICES**

**FOR THE**

Report for the Application (Kings County)  
and Ambient (Fresno County) Air Monitoring  
of Diazinon During Winter, 1998

Engineering and Laboratory Branch

Monitoring and Laboratory Division

Project No. C97-070 (Application)  
C97-069 (Ambient)

Date: November 6, 1998

APPENDIX I  
SAMPLING PROTOCOL



**Cal/EPA**

California  
Environmental  
Protection  
Agency



**Air Resources Board**

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## MEMORANDUM



Pete Wilson  
Governor

Peter M. Rooney  
Secretary for  
Environmental  
Protection

TO: John S. Sanders, Ph.D., Chief  
Environmental Monitoring and Pest  
Management Branch  
Department of Pesticide Regulation

FROM: George Lew, Chief *George Lew*  
Engineering and Laboratory Branch

DATE: January 9, 1998

SUBJECT: FINAL PROTOCOL FOR THE 1998 DIAZINON AIR  
MONITORING IN FRESNO COUNTY

Attached is the final protocol, "Protocol for the Application and Ambient Air Monitoring of Diazinon in Fresno County During Winter, 1998." The draft protocol was sent to you on December 17, 1997. No changes have been made to the draft as Pam Wales of your staff indicated there were no comments in a telephone conversation with Kevin Mongar of my staff on January 5, 1998.

If you or your staff have questions or need further information, please contact me at (916) 263-1630 or Mr. Kevin Mongar at (916) 263-2063.

### Attachment

cc: Ray Menebroker, Chief (w/Attachment)  
Project Assessment Branch  
Stationary Source Division

Cosmo Insalaco  
Fresno County  
Agricultural Commissioner

bcc: Bill Loscutt, MLD  
Peter Venturini, SSD  
Peter Ouchida, MLD

State of California  
California Environmental Protection Agency  
AIR RESOURCES BOARD

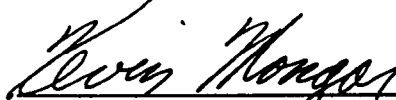
Protocol for the Application and Ambient  
Air Monitoring of Diazinon  
In Fresno County During Winter, 1998

Engineering and Laboratory Branch  
Monitoring and Laboratory Division

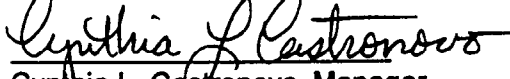
Project No.  
C97-069 Ambient  
C97-070 Application

Date: January 9, 1998

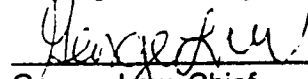
APPROVED:



Kevin Mongar, Project Engineer



Cynthia L. Castronovo, Manager  
Testing Section



George Lew, Chief  
Engineering and Laboratory Branch

This protocol has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Protocol for the Application and Ambient  
Air Monitoring of Diazinon  
In Fresno County During Winter, 1998

I. Introduction

At the request of the California Department of Pesticide Regulation (DPR) (October 31, 1995 Memorandum from John Sanders to George Lew), the Air Resources Board (ARB) staff determined airborne concentrations of the pesticide diazinon [O,O-Diethyl O-(6-methyl-2-(1-methylethyl)-4-pyrimidinyl) phosphorothioate] in Fresno County over a six week ambient monitoring program during the winter of 1997. This monitoring was done to fulfill the requirements of AB 1807/3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5) which requires the ARB "to document the level of airborne emissions .... of pesticides which may be determined to pose a present or potential hazard..." when requested by the DPR. A report containing the results of the 1997 monitoring program is being completed. Due to the heavy rainfall during January, 1997 the use of diazinon in Fresno County may have been less than "normal." Also, the minimum detection limit for the method has been decreased from approximately 25 ng/m<sup>3</sup> to approximately 0.60 ng/m<sup>3</sup> for a 24-hour sample. Therefore the ambient monitoring will be repeated for a three week period during January, 1998. The application monitoring will also occur in Fresno County during January, 1998. Monitoring is being conducted to coincide with the use of diazinon as an insecticide on dormant orchards.

The draft amended method development results and "Standard Operating Procedures for the Analysis of Diazinon in Ambient Air" are included as Attachment I.

II. Chemical Properties of Diazinon

Pure diazinon (CAS:333-41-5) is a clear colorless liquid with a faint ester-like odor. Technical grades are yellow. Diazinon has a molecular formula of C<sub>12</sub>H<sub>21</sub>N<sub>2</sub>O<sub>3</sub>PS, a formula weight of 304.35 g/mole, and a specific density of 1.116-1.118 at 20 °C. It has a water solubility of 71.1, 53.5, and 43.7 mg/L at 10, 20, and 30 °C respectively, a Henry's Constant of 1.13 x 10<sup>-7</sup> atm·m<sup>3</sup>/mol at 20 °C, and a vapor pressure of 8.47 x 10<sup>-5</sup> mmHG at 20 °C. Diazinon is miscible with a variety of organic solvents.

The hydrolysis half-life (t<sub>1/2</sub>) of diazinon in water (20°C) is 11.8 hours (pH 3.1); 185 days (pH 7.4); 136 days (pH 9.0) and 6 days (pH 10.4). Reported soil half-lives following incubation of 10 ppm diazinon are 12.5 weeks (sterile sand loam); 6.5 weeks (sterile organic soil); <1 week (non-sterile sand loam); and 2 weeks (non-sterile organic soil). Exposure of diazinon to UV light produces hydroxydiazinon. The photolytic t<sub>1/2</sub> for this reaction, in aqueous buffer solution (25 °C and pH 7.0), has been calculated to be 15 days. The t<sub>1/2</sub> of diazinon is approximately 3.2 weeks in a neutral solution at room temperature. Diazinon and its oxidative product diazoxon, have been found in fogwater. The distribution of diazinon (1.6 ng/m<sup>3</sup>) was 76.1% (vapor phase); 19.8% (dissolved phase); 3.7% (air particles); and 0.4% (water particles). The distribution of diazoxon was 13.4%, 81.7%, 4.9%, and 0.02% respectively.

The acute oral LD<sub>50</sub> of diazinon for rats ranges from 240 to 480 mg/kg. The LC<sub>50</sub> (96 hour) for rainbow trout is 16 mg/L, and 2.6 to 3.2 mg/L for bluegill sunfish. The OSHA 8-hour time weighted average for a personal exposure limit is 0.1 mg/m<sup>3</sup>. Diazinon has entered the risk assessment process at DPR under the SB 950 (Birth Defect Prevention Act of 1984) based on its potential for reproductive and mutagenic adverse health effects.

### III. Sampling

Samples will be collected by passing a measured volume of ambient air through XAD-2 resin. The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest (dry ice) or freezer until desorbed with 2.5 ml of ethyl acetate. The flow rate of 3 Lpm will be accurately measured and the sampling system operated continuously with the exact operating interval noted. The resin tubes will be protected from direct sunlight and supported about 1.5 meters above the ground during application monitoring sampling periods and 1.5 meters above roof tops for the ambient monitoring. At the end of each sampling period, the tubes will be capped and placed in culture tubes with an identification label affixed. Subsequent to sampling, the sample tubes will be transported on dry ice, as soon as reasonably possible, to the ARB Monitoring and Laboratory Division, Testing Section laboratory for analysis. The samples will be stored in the freezer or analyzed immediately.

A sketch of the sampling apparatus is shown in Figure 2. Calibrated rotameters will be used to set and measure sample flow rates. Samplers will be leak checked prior to and after each sampling period with the sampling cartridges installed. Any change in the flow rates will be recorded in the field log book. The field log book will also be used to record start and stop times, sample identifications and any other significant data.

### Ambient Monitoring

The use patterns for diazinon suggest that monitoring should occur in Fresno County during the months of January or February. Four sampling sites have been selected in relatively high-population areas or in areas frequented by people. At each site, twelve discrete 24-hour samples will be taken during the sampling period. Background samples will be collected in an area distant to diazinon applications. Replicate (collocated) samples will be collected for three dates (each Wednesday) at each sampling location.

Four sampling sites plus an urban background site were selected by ARB personnel from the areas of Fresno County where almond or stone fruit farming is predominant. Sites were selected for their proximity to the orchards with considerations for both accessibility and security of the sampling equipment. Addresses for the sites are listed in Table 1. The five sites are the same as those used for the 1997 ambient monitoring for diazinon. Referring to Figure 1, the sites are near areas of historical use of diazinon.

TABLE 1. Ambient Sampling Sites	
REE	Kings Canyon Unified District Office (209) 637-1200 675 W. Manning Carl Campbell Reedley, CA 93654
ARB	Air Resources Board, Ambient (209) 228-1825 Air Monitoring Station Pete Ouchida 3425 N First, Suite 205B Fresno, CA 93721
CEN	Centerville School (209) 787-2511 48 S. Smith Rosemary Debillar, Principal Centerville, CA 93657
SAN	Fairmont Elementary School (209) 875-6521 3095 N. Greenwood Richard Supelveda Sanger, CA 93657
PAR	Parlier High School (209) 646-3574 601 3rd Street Glenn Bundy, Principal Parlier, CA 93648

The samples will be collected by ARB personnel over a three week period from (tentatively) January 12 - January 30, 1997. 24-hour samples will be taken Monday through Friday (4 samples/week) at a flow rate of 3 L/minute.

#### Application Monitoring

The use pattern for diazinon suggests that application-site monitoring should be conducted during the months of January or February in Fresno County, and that the monitoring be associated with applications of diazinon to almonds or stone fruits. A three day monitoring period will be established with desired sampling times as follows: Application + 1 hour, followed by one 2-hour sample, one 4-hour sample, two 8-hour samples, and two 24-hour samples. A minimum of four samplers will be positioned, one on each side of the field. A fifth sampler will be collocated at one position. Since diazinon is extensively used in the area, background (before application) samples should be collected for a minimum of 12 hours at 3 liters/min. Ideally, samplers should be placed at a minimum of 20 meters from the field. If possible the samplers will be spaced equidistant from the edges of the field.

We will also provide in the monitoring report: 1) An accurate record of the positions of the monitoring equipment with respect to the field, 2) an accurate drawing of the monitoring site showing the precise location of the meteorological equipment, trees, buildings, etc., 3) meteorological data collected at a minimum of 15 minute intervals including wind speed and direction, humidity, and comments regarding degree of cloud cover, 4) the elevation of each sampling station with respect to the field and 5) the orientation of the field with respect to North (identified as either true or magnetic north). Samples collected during fog episodes will be designated as such.

#### IV. Analysis

The updated method development results and "Standard Operating Procedures for the Analysis of Diazinon in Ambient Air" are included as Attachment I. The procedures consist of extraction of the sorbent with 2.5 mL of ethyl acetate followed by GC/MSD analysis. The analytical limit of detection (LOD) associated with the 1997 monitoring was 65 ng per sample. The 1997 LOD was calculated by:  $LOD = |X_{int}| + 3(S)$ . For the 1998 monitoring the terminology and calculation has been changed to make it consistent with Federal EPA procedures. The analytical method detection limit (MDL) associated with the 1998 monitoring is approximately 2.5 ng per sample. The 1998 MDL calculation is:  $MDL = 3.14(S)$  for  $n=7$ .

#### VI. Quality Assurance

Field Quality Control for the ambient monitoring will include:

- 1) Five field spikes (same environmental and experimental conditions as those occurring at the time of ambient sampling). The field spikes will be obtained by sampling ambient air at the background monitoring site for 24 hour periods at 3 L/minute (i.e., collocated with a background sample).
- 2) Five trip spikes prepared at the same level as the field spikes.
- 3) Five lab spikes prepared at the same level as the field and trip spikes.
- 4) Replicate samples will be taken for three dates at each sampling location.
- 5) A Trip blank will be obtained each week of sampling.

Field Quality Control for the application monitoring will include:

- 1) Four field spikes (same environmental and experimental conditions as those occurring at the time of ambient sampling). The field spikes will be obtained by sampling ambient air during background monitoring at the application site for the same duration as the background samples at 3 L/minute (i.e., collocated with background samples).
- 2) Four trip spikes prepared at the same level as the field spikes.
- 3) Four lab spikes prepared at the same level as the field and trip spikes.
- 4) Replicate samples will be taken for all samples at one of the sampling locations.
- 5) A Trip blank will be obtained.

The instrument dependent parameters (reproducibility, linearity and minimum detection limit) will be checked prior to analysis. A chain of custody sheet will accompany all samples. Rotameters will be calibrated prior to and after sampling in the field.

## **VII. Personnel**

**ARB personnel will consist of Kevin Mongar (Project Engineer) and Instrument Technicians and/or student assistants from either the Testing Section or the Air Monitoring Central Section of ARB.**

# FIGURE 1. AMBIENT MONITORING AREA

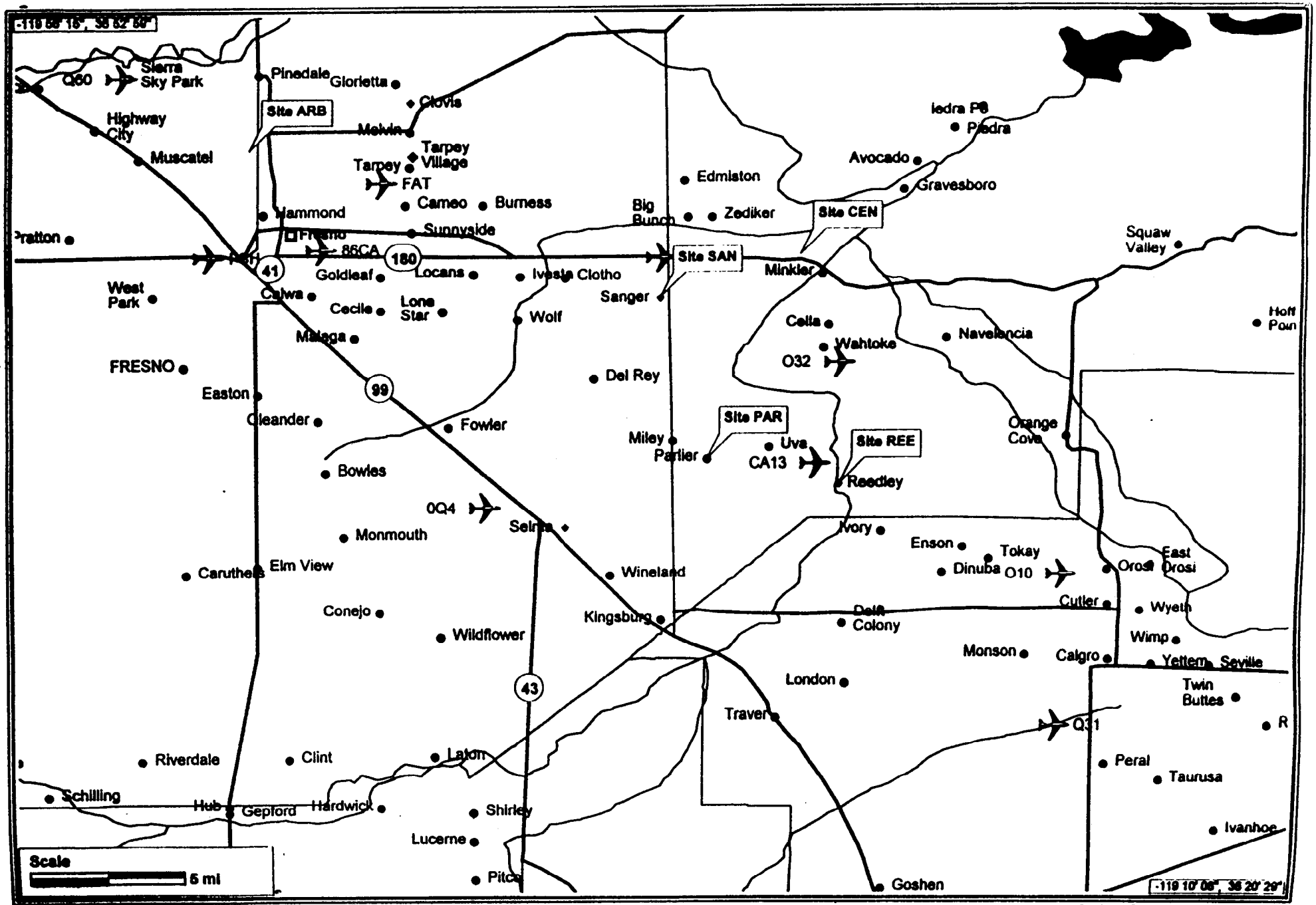
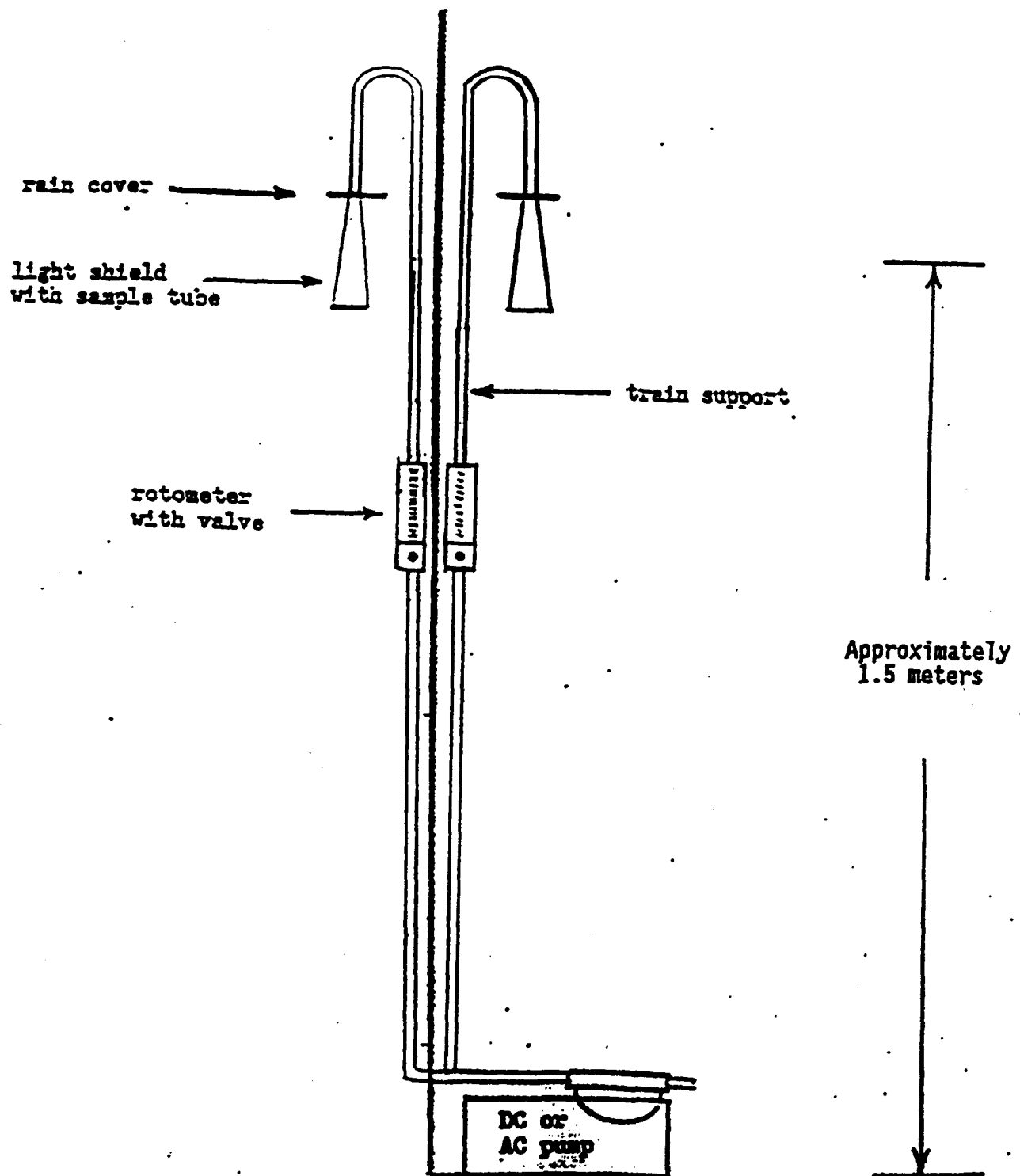


FIGURE 2  
Sampling Apparatus



**Attachment I**

**Standard Operating Procedures for the  
Analysis of Diazinon in Ambient Air**

State of California  
Air Resources Board  
Monitoring and Laboratory Division/ELB

Amended Standard Operating Procedure for the Sampling and  
Analysis of Diazinon in Ambient Air  
12/15/97 Version

Analyst: Ken Kiefer  
Reviewed by: R. Okamoto  
Kevin Mongar

1. SCOPE

This is a sorbent tube, solvent extraction, gas chromatography/mass selective detector method for the determination of Diazinon from ambient air samples.

2. SUMMARY OF METHOD

The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest on dry ice or freezer until desorbed during sonication into 2.5 ml of Diazinon D-10 spiked ethyl acetate. The splitless injection volume is 5 ul. A gas chromatograph with a DB-35 capillary column and a quadrapole mass spectrometer (ms)r is used for analysis. The ms detector is operated in selected ion monitoring mode.

3. INTERFERENCES/LIMITATIONS

Method interferences may be caused by contaminants in solvents, reagents, glassware and other processing apparatus that can lead to discrete artifacts or elevated baselines. Co-eluting compounds trapped during sample collection may also interfere. A method blank must be done with each batch of samples to detect any possible method interferences.

4. EQUIPMENT AND CONDITIONS

A. INSTRUMENTATION:

Hewlett Packard 5890 chromatograph  
Hewlett Packard 5971A mass selective detector  
Hewlett Packard 8200 Autosampler

Detector: 280°C

Injector: 270°C

Injector Liner: Double Goose Neck liner with glass wool

Column: J&W Scientific DB-35, 30 meter, 0.25 mm i.d., 0.25 um film thickness.

Pre-column: J&W Scientific Deactivated fused silica, 2 meter, 0.32 mm i.d.

GC Temp. Program: Initial 45°C, hold 4 min, to 175°C @ 45°C/min., to 205°C @ 3°C/min., to 250°C @ 45°C/min.

Injector:

Pressure Pulse: Initial 40.0 psi, hold 1.67 min, to 7.8 psi @ 99 psi/min  
Splitless: Purge on 2 min.

Gas Flows:

Column: He, 34 cm/min, electronic pressure control ( 7.8 psi @ 45 C).

Auto Sampler:

Sample washes - 1, Sample pumps - 4, Sample Volume - 5 stops, Viscosity delay - 0 sec, Solvent A washes - 4, Solvent B washes - 4

Mass Spectrometer:

Electron Ionization

Selective Ion Monitoring; Diazinon - 304 (quant. ion, 100%), 137 (qual. ion, 50%), 179 (qual. ion, 120%). Diazinon D-10 - 314 (quant. ion, 100%), 183 (qual. ion, 40%)

Tuning: PFTBA

#### B. AUXILIARY APPARATUS:

1. Glass amber vials, 8 mL capacity.
2. Vial Shaker, SKC, or equiv.
3. Sonicator, Branson 2210
4. Autosampler vials with septum caps.

#### C. REAGENTS

1. Ethyl Acetate, Pesticide Grade, or better
2. Diazinon, 98% pure or better (e.g., from Chem Service).
3. Diazinon D-10, 98% pure or better (e.g., from Cambridge Isotope Laboratories)

#### 5. ANALYSIS OF SAMPLES

1. A daily manual tune shall be performed using PFTBA. The instrument is tuned using masses - 69, 219, 502. The criteria for the tune are the peak widths at ½ the peak height,  $0.5 \pm .05$ , and the relative abundance; 69 - 100%; 219 - 55%, 502 - 2%.
2. It is necessary to analyze a solvent blank with each batch of samples. The blank must be free of interferences. A solvent blank must be analyzed after any sample which results in possible carry-over contamination.
3. A single point calibration check at the midpoint of the calibration curve shall be analyzed daily and the calibration updated, if it is within 20% of the average response factor from the previous 5 point calibration curve. If it is outside 20%, a new 5 point multipoint curve must be run.

4. At least one calibration sample must be analyzed for each batch of ten samples. The response of the standard must be within 20% of previous calibration analyses.

5. Carefully score the primary section end of the sampled XAD-2 tube above the retainer spring and break at the score. Remove the glass wool plug from the primary end of the XAD-2 tube with forceps and place it into an 8 mL amber colored sample vial. Pour the XAD-2 into the vial and add 2.5 mL ethyl acetate. Retain the secondary section of the XAD-2 tube for later analysis if needed to check the possibility of breakthrough.

6. Place the sample vial on a desorption shaker (or ultra sonic water-bath) for 30 minutes. Remove the diazinon extract and store in a second vial at -20°C until analysis.

7. After calibration of the GC system, inject 5.0 ul of the extract. If the resultant peaks for diazinon have a measured area greater than that of the highest standard injected, dilute the sample and re-inject.

8. Calculate the concentration in ng/mL based on the data system calibration response factors. If the sample has been diluted, multiply the calculated concentration by the dilution factor.

9. The atmospheric concentration is calculated according to:

$$\text{Conc., ng/m}^3 = (\text{Extract Conc., ng/mL} \times 2.5 \text{ mL}) / \text{Air Volume Sampled, m}^3$$

## 6. QUALITY ASSURANCE

### A. INSTRUMENT REPRODUCIBILITY

Five injections of 5 ul each were made of diazinon standards at three concentrations in order to establish the reproducibility of this instrument. This data (Testing Section lab, 7/30/97) is shown in Table 1.

PRELIMINARY DRAFT

TABLE 1. Instrument Reproducibility

D-10 Amt. (ng/ml)	D-10 Response	Diazinon Amt. (ng/ml)	Diazinon Response	Amt. Ratio	Resp Ratio	Response Ratio RSD
50	2249	6.9	385	0.14	0.17	6.6%
50	2349	6.9	419	0.14	0.18	
50	2781	6.9	491	0.14	0.18	
50	2985	6.9	535	0.14	0.18	
50	3463	6.9	527	0.14	0.15	
50	5219	12.7	1103	0.25	0.21	4.7%
50	5342	12.7	1129	0.25	0.21	
50	5514	12.7	1167	0.25	0.21	
50	5654	12.7	1100	0.25	0.19	
50	5813	12.7	1289	0.25	0.22	
50	5593	50.8	4860	1.02	0.87	3.7%
50	5492	50.8	5006	1.02	0.91	
50	5468	50.8	4852	1.02	0.91	
50	5367	50.8	4922	1.02	0.92	
50	5602	50.8	5355	1.02	0.96	

## B. LINEARITY

A five point calibration curve was made on 7/02/97. The calibration range was 12.5 ng/mL to 203 ng/mL diazinon. The corresponding response factor linear regression equation is:

$$\text{Response Ratio} = (0.879) * (\text{Amount Ratio}) \quad \text{RF Rel. Std. Dev.} = 7.5\%$$

where:

$$\text{Response Ratio} = (\text{diazinon response}) / (\text{diazinon D-10 response})$$

$$\text{Amount Ratio} = (\text{diazinon concentration}) / (\text{diazinon D-10 concentration})$$

Using EPA format, to minimize the number of calibrations performed, a midpoint (single point) calibration is performed daily. A laboratory check sample is run daily. If

the two analysis are within 20% of the assigned value, then analysis will begin. After every ten samples a calibration sample will be analyzed to verify the system is still in calibration.

#### C. MINIMUM DETECTION LIMIT

Detection Limit is based on EPA MDL calculation. Using the analysis of seven replicates of a low level matrix spikes, the method detection limit (MDL), the reliable detection limit (RDL), and the reliable quantitation limit (RQL) for diazinon were calculated by:

$$\text{MDL} = 3.14 * s$$

$$\text{RDL} = 2 * \text{MDL}$$

$$\text{RQL} = 2 * \text{RDL}$$

where:

s = the standard deviation of the concentration of the concentration calculated for the seven replicate spikes.

Given s = 0.413 for the seven samples, the MDL, RDL, and RQL are calculated as follows, MDL and RDL values are rounded to one place.

$$\text{MDL} = 3.14 * 0.413 = 1$$

$$\text{RDL} = 2 * 1.3 = 3$$

$$\text{RQL} = 2 * 2.6 = 5.2$$

Based on the 2.5 mL extraction volume and assuming a sample volume of 4.32 m<sup>3</sup> (3 lpm for 24 hours) the RQL for ambient concentration of diazinon is :

$$(5.2 \text{ ng/mL})(2.5 \text{ mL}) / (4.32 \text{ m}^3) = 1.5 \text{ ng/m}^3 \text{ per 24-hour sample}$$

#### D.\* COLLECTION AND EXTRACTION EFFICIENCY (RECOVERY)

Five microliters of a 106.9 ng/ml diazinon standard were spiked on the primary section of each of four XAD-2 sampling tubes. The spiked tubes were then subjected to an air flow of 2 lpm for 24 hours. The samplers were set-up in a garage/shop at an ambient temperature of approximately 30°C (maximum). The primary and back-up sections were then separately desorbed with ethyl acetate and analyzed. Percent recoveries of diazinon from primary sections of the four tubes were 98.8%, 101%, 96.5% and 98.9% with an average of 98.8%.

#### E.\* STORAGE STABILITY

Storage stability studies were conducted over a 125 day period. The primary sections of eight tubes were spiked with 4500 ng of diazinon. The spiked tubes were stored in the freezer at -20 C and extracted/analyzed on storage days 19, 49 and 125. Two tubes each were analyzed on days 19 and 49 while 3 tubes were

analyzed on day 125 (1 tube was lost during extraction). The storage recoveries (average results) were 97.5%, 117% and 90.7% for days 19, 49 and 125 respectively.

#### F. \* BREAKTHROUGH

The primary sections of four tubes were spiked with 534.5 ng diazinon/tube then run for 24 hours at 2 lpm (see Section D above). No diazinon was detected in the back-up resin bed of any of the tubes.

#### G. Safety

Diazinon is slightly to moderately toxic. As an organophosphate pesticide, it is an acetylcholinesterase inhibitor. The LD50 ranges from 2.75 mg/kg/day to nearly 450 mg/kg/day for rats. The NOEL is 0.01mg/kg/day for rats, 0.02mg/kg/day for monkeys, and 0.02mg/kg/day for humans. The ADI is 0.002 mg/kg/day. The TLV-TWA is 0.1 mg/m<sup>3</sup>. The RfD is 0.00009 mg/kg/day. Proper protection should be taken when handling samples and standards in the laboratory. Gloves and eye protection shall be worn. Sample preparation shall be performed in a hood.

- Collection and Extraction Efficiency, Storage Stability, and Breakthrough tests were performed using a previous version of the analytical method.

APPENDIX II

LABORATORY REPORT

State of California  
California Environmental Protection Agency  
Air Resources Board

Testing Laboratory Report

Diazinon Method Development and Diazinon Analytical Results for Application and  
Ambient Monitoring Samples

Engineering and Laboratory Branch  
Monitoring and Laboratory Division

Project No. C97-069 and C97-070  
July 22, 1998

## 1.0 Introduction

The Air Resources Board (ARB) staff developed an air sampling and analysis method for diazinon. Ambient air and application samples were collected and analyzed by ARB staff. This report covers diazinon method development, diazinon analytical results, and quality assurance results.

## 2.0 Method Development and Standard Operating Procedure.

In a previous ARB study many of the diazinon samples were below the detection limit of the analysis. There were concerns that levels below the detection limit were still needed by the Department of Pesticide Regulation. In the Fall of 1997 a revised diazinon procedure was developed and validated that lowered detection limits by an order of magnitude. The standard operating procedure (SOP) also includes procedures that more closely match US Environmental Protection Agency methodology. The standard operating procedure is given in Attachment 1.

## 3.0 Ambient Sample Results.

### 3.1 Samples Received:

#### Ambient Samples

77 ambient samples  
5 field spikes  
5 trip spikes  
5 laboratory spikes  
4 trip blanks

<u>Date Samples Received</u>	<u>Date Analysis Completed</u>
1/21/98	1/23/98
1/27/98	1/29/98
2/05/98	2/12/98

Samples were inspected upon receipt and any anomalies were recorded. Ambient samples PAR1, REE1, CEN1, ARB2, PAR2, CEN3, SAN3, SAN3D, REE3D, ARB7, PAR7, CEN10, and CEN10D contained water droplets. No other anomalies were recorded.

Presented in Table 1 are the results of the analysis of the diazinon ambient samples. Also included in Table 1 are the dates the laboratory received and analyzed the samples. An asterisk to the right of the diazinon amount denotes the

sample was analyzed in duplicate and the results are the average of the two analyses.

Table 1. Diazinon Ambient Results

Log Number	Sample ID	Date Received	Date Analyzed	Diazinon Amount (ng/sample)	
1	ARB01	1/21/98	1/22/98	Det	
2	PAR01	1/21/98	1/22/98	4.80E+1	
3	REE01	1/21/98	1/22/98	5.17E+1	
4	CEN01	1/21/98	1/22/98	< MDL	
5	SAN01	1/21/98	1/22/98	< MDL	
6	ARB02	1/21/98	1/22/98	Det	
7	PAR02	1/21/98	1/22/98	9.59E+1	
8	REE02	1/21/98	1/22/98	1.50E+2	
9	CEN02	1/21/98	1/22/98	Det	
10	SAN02	1/21/98	1/22/98	< MDL	*
11	ARB03	1/21/98	1/22/98	Det	
12	ARB03D	1/21/98	1/22/98	Det	
13	PAR03	1/21/98	1/22/98	1.37E+2	
14	PAR03D	1/21/98	1/22/98	1.38E+2	
15	REE03	1/21/98	1/22/98	1.28E+2	
16	REE03D	1/21/98	1/22/98	1.24E+2	
17	CEN03	1/21/98	1/22/98	Det	
18	CEN03D	1/21/98	1/22/98	Det	
19	SAN03	1/21/98	1/23/98	< MDL	
20	SAN03D	1/21/98	1/23/98	< MDL	*
21	ARB04	1/21/98	1/29/98	Det	*
22	PAR04	1/21/98	1/23/98	9.08E+1	
23	REE04	1/21/98	1/23/98	7.00E+1	
24	CEN04	1/21/98	1/23/98	< MDL	
25	SAN04	1/21/98	1/23/98	< MDL	
27	ARB05	1/27/98	1/28/98	< MDL	
28	PAR05	1/27/98	1/28/98	8.98E+1	
29	REE05	1/27/98	1/28/98	8.39E+1	
30	CEN05	1/27/98	1/28/98	< MDL	
31	SAN05	1/27/98	1/28/98	< MDL	
32	ARB06	1/27/98	1/28/98	Det	
33	ARB06D	1/27/98	1/28/98	Det	
34	PAR06	1/27/98	1/28/98	1.12E+2	
35	PAR06D	1/27/98	1/28/98	1.21E+2	*
36	REE06	1/27/98	1/28/98	9.14E+1	
37	REE06D	1/27/98	1/28/98	9.05E+1	
38	CEN06	1/27/98	1/28/98	Det	
39	CEN06D	1/27/98	1/28/98	4.57E+1	
40	SAN06	1/27/98	1/28/98	Det	
41	SAN06D	1/27/98	1/28/98	Det	
42	ARB07	1/27/98	1/28/98	Det	
43	PAR07	1/27/98	1/28/98	2.83E+2	
44	REE07	1/27/98	1/28/98	7.49E+1	
45	CEN07	1/27/98	1/28/98	Det	*
46	SAN07	1/27/98	1/28/98	7.81E+1	
47	ARB08	2/5/98	2/11/98	1.38E+2	
48	PAR08	2/5/98	2/11/98	8.74E+2	
49	REE08	2/5/98	2/11/98	1.92E+2	
50	CEN08	2/5/98	2/11/98	1.31E+2	
51	SAN08	2/5/98	2/11/98	1.12E+2	
52	ARB09	2/5/98	2/11/98	6.19E+1	
53	PAR09	2/5/98	2/11/98	4.87E+2	
54	REE09	2/5/98	2/11/98	1.58E+2	
55	CEN09	2/5/98	2/11/98	4.16E+2	*
56	SAN09	2/5/98	2/11/98	8.79E+1	
57	ARB10	2/5/98	2/11/98	1.78E+2	
58	ARB10D	2/5/98	2/11/98	1.55E+2	
59	PAR10	2/5/98	2/11/98	2.74E+2	
60	PAR10D	2/5/98	2/11/98	2.87E+2	
61	REE10	2/5/98	2/11/98	1.38E+2	
62	REE10D	2/5/98	2/11/98	1.29E+2	
63	CEN10	2/5/98	2/12/98	5.05E+1	
64	CEN10D	2/5/98	2/12/98	4.97E+1	
65	SAN10	2/5/98	2/12/98	1.19E+2	
66	SAN10D	2/5/98	2/12/98	1.12E+2	*
67	ARB11	2/5/98	2/12/98	< MDL	
68	PAR11	2/5/98	2/12/98	1.33E+2	
69	REE11	2/5/98	2/12/98	Det	
70	CEN11	2/5/98	2/12/98	Det	
71	SAN11	2/5/98	2/12/98	Det	

#### 4.0 Diazinon Ambient Analytical Quality Control

With the analysis of each batch of samples a series of calibration samples and QA samples were run. A summary of the results are given in this section.

##### 4.1 Mass spectrometer tune

Prior to the analysis of a batch of samples the mass spectrometer was manually tuned. Tune parameters are given in the diazinon SOP (section 5.1).

##### 4.2 Laboratory solvent blanks

Prior to the analysis of a sample batch a laboratory solvent blank was analyzed. Four batches of ambient diazinon samples were analyzed. Given in Table 2 are the results of the laboratory solvent blanks for the four sample batches. No diazinon was detected in any of the laboratory solvent blanks.

Table 2. Laboratory solvent blanks

Sample Name	Date	Diazinon Amount (ng/sample)
RB9801211	1/22/98	<MDL*
RB9801282	1/28/98	<MDL
RB9801291	1/29/98	<MDL
RB980211	2/11/98	<MDL

\* <MDL = Amount less than the method detection limit.

##### 4.3 Calibration.

A 5 point multi-point calibration was run prior to each batch of samples.

#### 4.4 Laboratory control spikes

Prior to the analysis of each batch of samples two laboratory control spikes (LCS) were run. A LCS is a resin cartridge spiked with 250 ngs or 62.5 ngs of diazinon. The check sample is prepared and analyzed the same way as the samples. LCS recoveries ranged from 79%-98% and the relative difference between samples in each set ranged from 2.46%-6.45%. The results are presented in Table 3.

Table 3. Laboratory control spike results.

Sample Name	Date Analyzed	Diazinon Amount (ng/sample)	Diazinon Expected (ng/sample)	Percent Recovery	Relative difference
LC01	1/22/98	199	250	80%	
LC02	1/22/98	225	250	90%	6.18%
LC03	1/29/98	208	250	83%	
LC04	1/29/98	198	250	79%	2.47%
LC07	2/11/98	58.1	62.5	93%	
LC08	2/11/98	61.3	62.5	98%	2.70%

#### 4.5 Laboratory control blanks

A single laboratory control blank (LCB) is run prior to the analysis of each sample batch. The LCB blank sample cartridge is prepared and analyzed the same way the samples are analyzed. The LCB results are presented in Table 4. <MDL means the level in the blanks were lower than the detection level. No diazinon was detected in any of the laboratory control blanks.

Table 4. Laboratory control blank results

Sample Name	Date Analyzed	Diazinon Amount (ng/sample)
LB98012118	2/22/98	<MDL*
LB980128	2/29/98	<MDL
LB980211	2/11/98	<MDL

\* <MDL = Amount less than the method detection limit

#### 4.6 Calibration check samples

Calibration check samples (CCS) are analyzed with each batch of samples. A CCS is run after every tenth sample in a sample batch. CCS samples are run to ensure instrument drift does not exceed 20%. CCS sample results are given in Table 5. The average CCS percent recovery was 102% of the expected diazinon amount with a relative standard deviation of 3.82%

Table 5. Calibration check sample results

Sample Name	Date Run	Diazinon Amount (ng/sample)	Diazinon Expected (ng/sample)	Percent Recovery
CC9801221	1/22/98	242	250	97%
CC9801222	1/22/98	244	250	98%
CC9801223	1/22/98	247	250	99%
CC9801281	1/28/98	253	250	101%
CC9801282	1/28/98	259	250	104%
CC9801291	1/29/98	246	250	98%
CC9801292	1/29/98	259	250	103%
CC9802111	2/11/98	261	250	104%
CC9802112	2/11/98	269	250	108%
CC9802113	2/11/98	268	250	107%

#### 4.7 Duplicate analysis

Duplicate analysis is performed on every tenth sample in a sample batch. Results are given in Table 6. Relative difference was calculated on duplicate pairs when the values were at or higher than the EQL. The relative difference ranged from 0.7%-14.0%.

Table 6. Duplicate analysis results

Sample Name	Diazinon Amount (ng/sample)	Average (ng/sample)	Relative Difference
ARB04-1	NQ		
ARB04-2	NQ	NQ <sup>2</sup>	NC <sup>3</sup>
CEN07-1	NQ		
CEN07-2	NQ	NQ	NC
CEN09-1	401		
CEN09-2	430	4.1E + 2	7.05%
PAR06D-1	121		
PAR06D-2	122	1.21E + 2	0.70%
SAN02-1	<MDL <sup>1</sup>		
SAN02-2	<MDL	NQ	NC
SAN03D-1	NQ		
SAN03D-2	NQ	NQ	NC
SAN10D-1	114		
SAN10D-2	109	1.12E + 2	5.35%
SAN12-1	NQ		
SAN12-2	NQ	NQ	NC
TS05-1	83.2		
TS05-2	72.3	7.77E + 1	14.0%

<sup>1</sup><MDL = level below the method detection level

<sup>2</sup>NQ = not quantitated

<sup>3</sup>NC = not calculated

## 5.0 Field, trip, and laboratory spikes and trip blanks

Five laboratory spikes, five trip spikes and five field spikes were analyzed for the ambient diazinon test.

### 5.1 Laboratory spikes

Five laboratory spikes were spiked with 100 ngs of diazinon on 1/09/98 and stored in the Testing's Laboratory freezer at 0°C until they were analyzed on 1/29/98. The laboratory spike results are given in Table 7.

Table 7. Laboratory spikes results

Sample Name	Date Spiked	Diazinon Amount (ng/sample)	Amount Diazinon Spiked (ng/sample)	Percent Recovery
LS01	1/09/98	72.8	100	73%
LS02	1/09/98	72.4	100	72%
LS03	1/09/98	76.5	100	77%
LS04	1/09/98	72.1	100	72%
LS05	1/09/98	80.9	100	81%

### 5.2 Trip spikes

A series of 5 trip spikes were spiked with 100 ngs of diazinon on 1/09/98. Trip spikes were taken to the sampling site and returned to laboratory along with a batch of samples which were analyzed on 1/29/98. The trip spike results are given in Table 8.

Table 8. Trip spike results

Sample Name	Date Spiked	Diazinon Amount (ng/sample)	Amount Diazinon Spiked (ng/sample)	Percent Recovery
TS01	1/09/98	82.5	100	82%
TS02	1/09/98	83.7	100	84%
TS03	1/09/98	85.4	100	85%
TS04	1/09/98	73.1	100	73%
TS05	1/09/98	77.7	100	78%

### 5.3 Field spikes

A series of 5 field spikes were spiked with 100 ngs of diazinon on 1/09/98. Field spikes were taken to the sampling site and ambient air was sampled on the field spikes. A colocated and unspiked sample was taken concurrently with the field spikes. The field spike was returned to the laboratory along with a batch of samples. The field spike results are given in Table 9.

Table 9. Field spike results

Sample Name	Date Spiked	Date Analyzed	Diazinon Amount (ng/sample)	Expected Amount (ng/sample)
FS01	1/09/98	1/28/98	103	100
FS02	1/09/98	1/28/98	98.7	100
FS03	1/09/98	1/28/98	99.6	100
FS04	1/09/98	1/28/98	98.2	100
FS05	1/09/98	1/28/98	95.0	100

### 5.4 Trip blanks

Four trip blanks were taken to the sampling site and returned to the laboratory with a batch of samples. The trip blank result is given in Table 10.

Table 10. Trip blank results

Sample Name	Date Analyzed	Amount in Sample (ng/sample)
TB04	1/21/98	<MDL*
TB07	1/29/98	<MDL
TB11	2/11/98	<MDL
TB12	2/11/98	<MDL

\* <MDL = less than the method detection limit

## 6.0 Diazinon Application Results

### 6.1 Samples Recieved

#### Application Samples

43 application samples

4 field spikes

4 trip spikes

4 laboratory spikes

2 trip blanks

Date Samples received

2/02/98

Date Analysis Completed

2/21/98

Samples were inspected upon receipt and any anomalies were recorded. Application samples W3, E4, S4, W4, N4, and E6 contained water droplets. No other anomalies were recorded.

Presented in Table 11 are the analytical results of the diazinon application samples. Also included in Table 11 are dates the laboratory received and analyzed the samples. An asterisk to the right of the diazinon amount denotes the sample was analyzed in duplicate and the results are the average of the two analyses.

Table 11. Diazinon application sample results

Log Number	Sample ID	Date Received	Date Analyzed	Diazinon Amount (ng/sample)
7	SB	2/2/98	2/9/98	8.56E+1
8	SFS02	2/2/98	2/9/98	1.60E+2
5	WB	2/2/98	2/9/98	1.03E+2
6	WFS03	2/2/98	2/9/98	1.71E+2
3	NB	2/2/98	2/9/98	2.25E+2
4	NFS04	2/2/98	2/9/98	2.32E+2
1	EB	2/2/98	2/9/98	8.40E+1
2	EFS01	2/2/98	2/9/98	1.29E+2
10	E01	2/2/98	2/20/98	1.60E+3
11	E01D	2/2/98	2/20/98	1.23E+3
12	S01	2/2/98	2/20/98	8.33E+2
13	W01	2/2/98	2/20/98	3.66E+3
14	N01	2/2/98	2/20/98	2.96E+3
15	E02	2/2/98	2/20/98	6.36E+2
16	E02D	2/2/98	2/20/98	6.07E+2
17	S02	2/2/98	2/9/98	4.93E+2
18	W02	2/2/98	2/20/98	1.86E+3
19	N02	2/2/98	2/20/98	1.04E+3 *
20	E03	2/2/98	2/20/98	2.26E+3
21	E03D	2/2/98	2/20/98	2.30E+3
22	S03	2/2/98	2/20/98	2.64E+3
23	W03	2/2/98	2/20/98	4.21E+3
24	N03	2/2/98	2/20/98	2.70E+3
25	E04	2/2/98	2/20/98	1.66E+3
26	E04D	2/2/98	2/20/98	1.87E+3
27	S04	2/2/98	2/20/98	1.97E+3
28	W04	2/2/98	2/20/98	2.32E+3
29	N04	2/2/98	2/20/98	1.20E+3 *
30	E05	2/2/98	2/9/98	1.13E+2
31	E05D	2/2/98	2/9/98	2.01E+2
32	S05	2/2/98	2/9/98	2.25E+2
33	W05	2/2/98	2/20/98	4.13E+3
34	N05	2/2/98	2/9/98	2.09E+2
35	E06	2/2/98	2/9/98	3.84E+2
36	E06D	2/2/98	2/9/98	3.28E+2
37	S06	2/2/98	2/9/98	2.38E+2
38	W06	2/2/98	2/20/98	9.93E+3
39	N06	2/2/98	2/20/98	3.82E+3
40	E07	2/2/98	2/20/98	5.38E+2
41	E07D	2/2/98	2/20/98	5.85E+2
42	S07	2/2/98	2/20/98	5.84E+2
43	W07	2/2/98	2/20/98	2.57E+3 *
44	N07	2/2/98	2/20/98	7.47E+2

## 7.0 Diazinon Application Analytical Quality Control

With the analysis of each batch of samples a series of calibration samples and QA sample were run. A summary of the results are given in this section.

### 7.1 Mass spectrometer tune

Prior to the analysis of a batch of samples the mass spectrometer was manually tuned. Tune parameters are given in the diazinon SOP (section 5.1).

### 7.2 Laboratory solvent blanks

Prior to the analysis of a batch of samples a laboratory solvent blank was run. For the application diazinon samples three sample batches were run. Given in Table 12 are the results of the laboratory solvent blanks for the three sample batches. No diazinon was detected in any of the laboratory solvent blanks.

Table 12. Diazinon application laboratory solvent blanks

Sample Name	Date	Diazinon Amount (ng/sample)
RB9802231	2/23/98	<MDL*
RB9802041	2/5/98	<MDL
RB9802201	2/20/98	<MDL

\* <MDL = Amount less than the method detection limit.

### 7.3 Calibration

A 5 point multi-point calibration was run prior to each batch of samples.

#### 7.4 Laboratory control spikes

Prior to the analysis of a batch of samples two laboratory control spikes (LCS) were run. A LCS is a resin cartridge spiked with 250 ng of diazinon. The check sample is prepared and analyzed the same way as the samples. LCS recoveries ranged from 85%-91% and the relative difference between samples was 4.32%. The results are presented in Table 13.

Table 13. Laboratory control spike results

Sample Name	Date Analyzed	Diazinon Amount (ng/sample)	Diazinon Expected (ng/sample)	Percent Recovery	Relative difference
LC05	2/5/98	227	250	91%	
LC06	1/22/98	213	250	85%	4.32%

#### 7.4 Laboratory control blank

A single laboratory control blank (LCB) is also run prior to the analysis of each batch of samples. The LCB blank sample cartridge is prepared and analyzed the same way the samples are analyzed. The laboratory control blank results are presented in Table 14. <MDL means the level in the blanks were below the method detection limit. No diazinon was detected in any of the laboratory control blanks.

Table 14. Diazinon application laboratory control blank result

Sample Name	Date Analyzed	Diazinon Amount (ng/sample)
LB03	2/5/98	<MDL*

\* <MDL = Amount less than the method detection limit

## 7.5 Calibration check samples

Calibration check samples (CCS) are analyzed with each batch of samples. A calibration check sample is run after every tenth sample in a sample batch. CCS samples are run to ensure instrument drift does not exceed 20%. CCS sample results are given in Table 15. The average CCS percent recovery was 101% of the expected diazinon amount with a relative standard deviation of 9.01%.

Table 15. Diazinon application calibration check results

Sample Name	Date Run	Diazinon Amount (ng/sample)	Diazinon Expected (ng/sample)	Percent Recovery
SCC980204	2/5/98	257	250	103%
SCC980204	2/6/98	250	250	100%
SCC980204	2/6/98	240	250	96%
SCC980204	2/6/98	225	250	90%
SCC980204	2/6/98	260	250	104%
SCC980204	2/6/98	293	250	117%
SCC980204	2/7/98	244	250	97%
SCC980220	2/20/98	726	625	116%
SCC980220	2/20/98	627	625	100%
SCC980220	2/20/98	605	625	97%

## 7.7 Duplicate analysis

Duplicate analysis is performed on every tenth sample in a sample batch. Results are given in Table 16. Relative difference was calculated on duplicate pairs when the values were at or higher than the estimated quantitation limit (EQL). The relative difference ranged from .09%-7.36%.

Table 16. Duplicate analysis of diazinon application samples

Sample Name	Diazinon Amount (ng/sample)	Average (ng/sample)	Relative Difference
N01-1	1040		
N01-2	1039	1.04E + 3	0.15%
N04-1	1197		
N04-2	1209	1.20E + 3	0.95%
W07-1	2665		
W07-2	2475	2.57E + 3	7.36%
W07-1 Backup	<MDL <sup>1</sup>		
W07-2 Backup	<MDL	NQ <sup>2</sup>	NC <sup>3</sup>
LS01-1	58.58		
LS01-2	58.53	5.86E + 1	0.09%
TB-1	<MDL		
TB-2	<MDL	NQ	NC

<sup>1</sup><MDL = level below the method detection level

<sup>2</sup>NQ = not quantitated

<sup>3</sup>NC = not calculated

## 8.0 Field, trip, laboratory spikes and trip blanks

Four laboratory spikes, four trip spikes and four field spikes were analyzed for the diazinon application test.

### 8.1 Laboratory spikes

Four laboratory spikes were spiked with 100 ngs of diazinon on 1/21/98 and stored in the Testing's Laboratory freezer at 0°C until they were analyzed on 2/8/98. The laboratory spike results are given in Table 17.

Table 17. Diazinon application laboratory spikes

Sample Name	Date Spiked	Diazinon Amount (ng/sample)	Amount Diazinon Spiked (ng/sample)	Percent Recovery
LS01	1/21/98	58.8	100	59%
LS02	1/21/98	58.8	100	59%
LS03	1/21/98	51.9	100	52%
LS04	1/21/98	57.4	100	57%

### 8.2 Trip spikes

Four trip spikes were spiked with 100 ngs of diazinon on 1/21/98. Trip spikes were taken to the sampling site and returned to laboratory along with a batch of samples. The laboratory spike results analyzed on 2/8/98 are given in Table 18.

Table 18. Diazinon application trip spikes

Sample Name	Date Spiked	Diazinon Amount (ng/sample)	Amount Diazinon Spiked (ng/sample)	Percent Recovery
TS01	1/09/98	60.9	100	61%
TS02	1/09/98	63.4	100	63%
TS03	1/09/98	66.6	100	67%
TS04	1/09/98	59.6	100	60%

### 8.3 Field spikes

A series of four field spikes were spiked with 100 ngs of diazinon on

1/21/98. Field spikes were taken to the sampling site and a air was sampled on the field spike. A colocated and unspiked sample was taken concurrently with the each field spike. The field spike was returned to the laboratory along with a batch of samples. The field spike results are given in Table 19.

Table 19. Field spike results.

Sample Name	Date Spiked	Date Analyzed	Amount in Spiked Sample (ng/sample)	Amount in Collocated Sample (ng/sample)	Net Amount (ng/sample)	Percent Recovery
EFS01	1/21/98	2/11/98	129	84.0	45.4	45%
SF02	1/21/98	2/11/98	160	85.6	74.1	74%
WF03	1/21/98	2/11/98	171	103	67.7	68%
NFS04	1/21/98	2/11/98	232	225	6.62	6.6%

### 8.3 Trip blank

A trip blank was taken to the sampling site and returned to the laboratory with a batch of samples. The trip blank result is given in Table 20.

Table 20. Trip blank results

Sample Name	Date Analyzed	Amount in Sample (ng/sample)
TB	5/04/98	<MDL*

\* <MDL = less than the method detection limit

## 9.0 Backup resin analysis

The backup resin bed of ten samples with the highest diazinon samples were analyzed for breakthrough. No diazinon was detected in any of the backup resin beds. The results are given in Table 21.

Table 21. Blank resin results

Sample Name	Diazinon Amount (ng/sample)
E03	<MDL*
E03D	<MDL
N01	<MDL
N06	<MDL
S03	<MDL
W01	<MDL
W03	<MDL
W05	<MDL
W06	<MDL
W07	<MDL

\* <MDL = Amount less than the method detection limit

## 10. Diazinon Chromatograms and Extracted Ion Profiles

Figure 1. Extracted ion profile of a diazinon standard at 10 pg/ul at 2.5 times the method detection limit of 3.6 pg/ul.

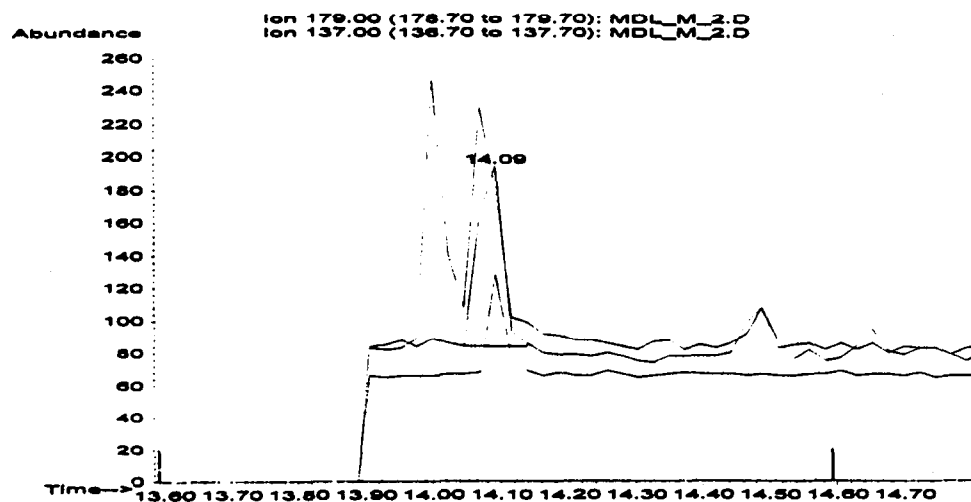


Figure 2. Total ion chromatogram of a ambient field spike sample spiked at 40 pg/ul. The retention time of diazinon is 13.9 minutes.

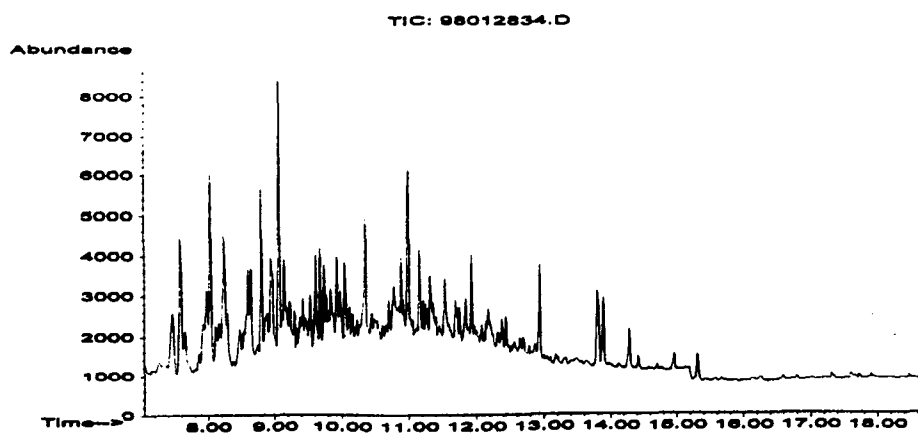


Figure 3. Extracted ion profile of XAD resin blank. No diazinon was detected.

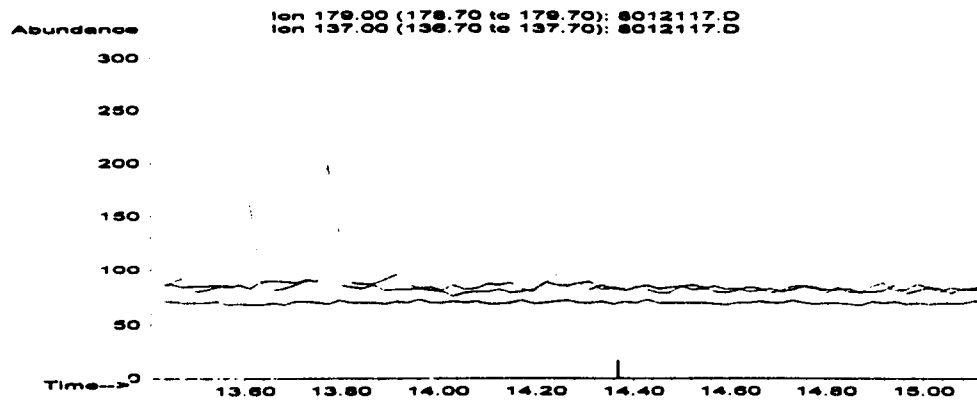
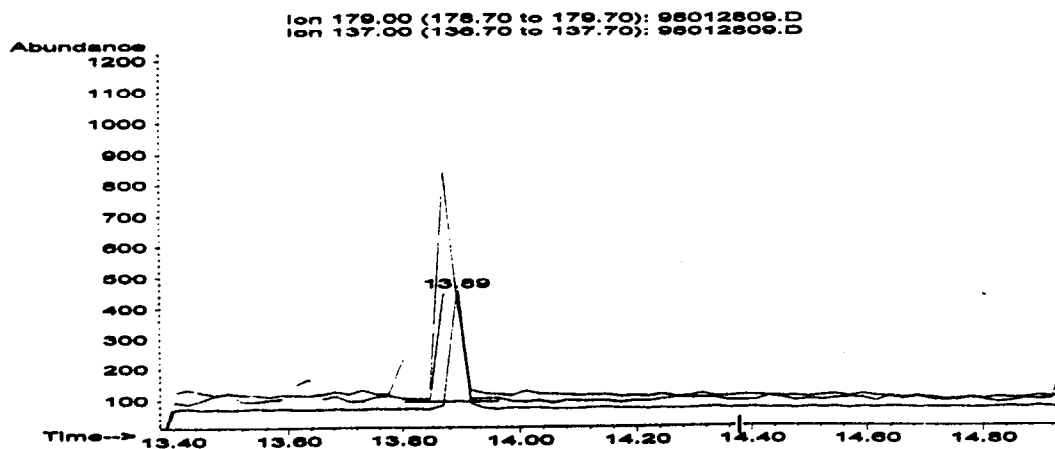


Figure 4. Shown below is sample PAR06 extracted ion profile of ions with m/e of 304, 137 and 179. Diazinon peak is at 13.89 minutes and the diazinon concentration is 44.9 pg/ul.



Attachment 1  
State of California  
Air Resources Board  
Monitoring and Laboratory Division/ELB

Standard Operating Procedure for the Sampling and  
Analysis of Diazinon in Ambient Air  
6/29/98 Version

Analyst: Ken Kiefer and R. Okamoto

Reviewed by: R. Okamoto  
Kevin Mongar

1. SCOPE

This is a sorbent tube, solvent extraction, gas chromatography/mass spectrometry method for the determination of diazinon from ambient air samples.

2. SUMMARY OF METHOD

The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest on dry ice or freezer until desorbed during sonication into 2.5 ml of ethyl acetate. The sorbent is spiked with 500ng of diazinon-D<sub>10</sub> prior to extraction. The splitless injection volume is 4 ul. A gas chromatograph with a DB-17MS capillary column and a quadrapole mass spectrometer (MS) is used for analysis. The MS detector is operated in selected ion monitoring mode.

3. INTERFERENCES/LIMITATIONS

Method interferences may be caused by contaminants in solvents, reagents, glassware and other processing apparatus that can lead to discrete artifacts or elevated baselines. Co-eluting compounds trapped during sample collection may also interfere. A method blank must be analyzed with each batch of samples to detect any possible method interferences.

4. EQUIPMENT AND CONDITIONS

A. INSTRUMENTATION:

Hewlett Packard 5890 chromatograph  
Hewlett Packard 5971A mass selective detector  
Hewlett Packard 8200 autosampler

Hewlett Packard 8200 autosampler

Detector: 280°C

Injector: 250°C

Injector Liner: Double goose neck liner with glass wool

Column: J&W Scientific DB-17MS, 30 meter, 0.25 mm i.d., 0.25 um film thickness.

Pre-column: J&W Scientific deactivated fused silica, 2 meter, 0.25 mm i.d.

GC Temp. Program: Initial 50°C, hold 5 min., to 220°C @ 25°C/min., hold 2 min., to 280°C @ 5°C/min., hold 1 min.

Injector:

Pressure Pulse: Initial 6.4 psi, to 40 psi @ 99 psi/min, hold 1.31 min, to 6.4 psi @ 99 psi/min

Splitless: Purge on 2 min.

Gas Flows:

Column: Linear velocity: 32 cm/sec, electronic pressure control (6.4 psi @ 50 °C).

Auto Sampler:

Sample washes - 1, Sample pumps - 4, Sample Volume - 4 stops, Viscosity delay - Zero sec, Solvent A washes - 4, Solvent B washes - 4

Mass Spectrometer:

Electron Ionization

Selective Ion Monitoring; diazinon -304 (quant. ion, 100%), 137 (qual. ion, 50%), 179 (qual. ion, 120%). Diazinon-D<sub>10</sub> - 314 (quant. ion, 100%), 183 (qual. ion, 40%).

Tuning: PFTBA

## B. AUXILIARY APPARATUS:

1. Glass amber vials, 8 mL capacity.
2. Glass amber vials, 4 mL capacity.
3. Vial shaker, SKC, or equiv.
4. Sonicator, Branson 2210

### C. REAGENTS

1. Ethyl Acetate, Pesticide Grade, or better
2. Diazinon, 98% pure or better (e.g., from Chem Service).
3. Diazinon-D<sub>10</sub>, 99% pure or better (e.g., from Cambridge Isotope Laboratories)

### 5. ANALYSIS OF SAMPLES

1. A daily manual tune shall be performed using PFTBA. The instrument is tuned using masses - 69, 219, 502. The criteria for the peak widths at ½ the peak height is  $0.5 \pm .05$ . The criteria for relative abundances are; 69 - 100%; 219 - 60-70%; and 502 - 2-5%.
2. It is necessary to analyze a solvent blank with each batch of samples. The blank must be free of interferences. A solvent blank must be analyzed after any sample which results in possible carry-over contamination.
3. A 5 point calibration curve shall be analyzed with each batch of samples. A single point calibration check at the midpoint of the calibration curve may be substituted for the 5 point calibration curve provided that it is within 20% of the average response factor from an initial 5 point multipoint calibration curve and the calibration updated. Then a second midpoint calibration standard is run. If both midpoint calibrations are within 20% of each other then analysis of batch samples can proceed.
4. With each batch of samples a laboratory blank and two laboratory check samples will be run. A laboratory blank is a blank resin cartridge prepared and analyzed the same way the samples are analyzed. A laboratory check sample is a resin cartridge spiked with a known amount of standard. The check sample is prepared and analyzed the same way as the samples. Laboratory check samples need to be within 20% ( $100 \times \text{difference} / \text{average}$ ) of each other and have recoveries that are  $\pm 30\%$  of the theoretical spiked value.
5. At least one calibration check sample must be analyzed for each batch of ten samples. The response of the standard must be within 20% of the initial calibration analyses for the batch. If the calibration check is outside the limit then those samples in the batch after the last calibration check that was within the 20% limit need to be reanalyzed.
6. Carefully score the secondary section end of the sampled XAD-2 tube above the glasswool and break at the score. Remove the glass wool plug from the secondary end of the XAD-2 tube with forceps and place it into a 4 mL amber colored sample vial. Pour the backup portion of the XAD-2

into the same vial. Spike the back end of the primary XAD with 12.5 ul of 20 ng/ml diazinon-D<sub>10</sub>. Let the solvent evaporate for approximately 10 minutes. Remove the middle glass wool plug and store in the 4 mls amber vial. Retain the secondary section of the XAD-2 tube for later analysis if needed to check the possibility of breakthrough.

7. Pour the primary XAD into a 8 ml vial. Remove the glasswool plug and put it into the 8 ml vial. Rinse the tube with 2.5 ml of ethyl acetate and pour rinse into the 8 ml vial.
8. Place the sample vial on a desorption shaker (or ultra sonic water-bath) for 30 minutes. Remove the diazinon extract and store in a second vial at - 20°C until analysis.
9. After calibration of the GC system, inject 4.0 ul of the extract. If the resultant peaks for diazinon has a measured concentration greater than that of the highest standard injected, dilute the sample and re-inject.
11. Calculate the concentration in ng/mL based on the data system calibration response factors. If the sample has been diluted, multiply the calculated concentration by the dilution factor.
12. The atmospheric concentration is calculated according to:

$$\text{Conc., ng/m}^3 = (\text{Extract Conc., ng/mL} \times 2.5 \text{ mL}) / (\text{Air Volume Sampled, m}^3)$$

## 6. QUALITY ASSURANCE

### A. INSTRUMENT REPRODUCIBILITY

Five injections of 4 ul each were made of diazinon standards at three concentrations in order to establish the reproducibility of this instrument. This data (Testing Section lab, 12/11/97) is shown in Table 1.

TABLE 1. Instrument Reproducibility

Diazinon-D <sub>10</sub> Conc. (ng/ml)	Diazinon-D <sub>10</sub> Response	Diazinon Conc. (ng/ml)	Diazinon Response	Amt. Ratio	Resp Ratio	Response Ratio RSD (%)
100	2743	12.5	368	.125	.134	4.72
100	2544	12.5	379	.125	.149	
100	2757	12.5	410	.125	.149	
100	2691	12.5	406	.125	.151	
100	2436	12.5	347	.125	.142	
100	2628	50	1643	.50	.625	4.75
100	2454	50	1584	.50	.645	
100	2491	50	1566	.50	.629	
100	2467	50	1490	.50	.604	
100	2165	50	1483	.50	.684	
100	2974	250	10800	2.5	3.63	2.72
100	2781	250	9737	2.5	3.50	
100	2650	250	9820	2.5	3.71	
100	2089	250	7722	2.5	3.70	
100	2877	250	10104	2.5	3.51	

## B. CALIBRATION

### Initial Calibration

A five point calibration curve was made on 12/11/97. The calibration range was 250 ng/mL to 12.5 ng/mL diazinon. The corresponding response factor regression equation is:

$$\text{Response Ratio} = (1.28) * (\text{Amount Ratio}) \text{ RF Rel. Std. Dev.} = 11.9\%$$

where:

Response Ratio = (Diazinon response)/( Diazinon-D<sub>10</sub> response)

Amount Ratio = (Diazinon concentration)/ Diazinon-D<sub>10</sub> concentration)

Using EPA format, to minimize the number of calibrations performed, a midpoint (single point) calibration is performed daily. A laboratory check sample is run daily. If the two analysis are within 20% of the assigned value, then analysis will begin. After every ten samples a calibration sample will be analyzed to verify the system is still in calibration. Alternately a full multi-point calibration curve can be performed before analyzing a batch of samples.

Linearity

A linear regression was also performed on the calibration curve made on 12/11/97.

Resp Ratio = (153)\*(amount ratio) + -1.13e<sup>-1</sup>

R<sup>2</sup> = .995

#### C. MINIMUM DETECTION LIMIT

Detection limit is based on USEPA detection limit calculation. Using the analysis of seven replicates of a low level matrix spikes, the method detection limit (MDL), and the estimated quantitation limit (EQL) for diazinon were calculated by:

$$MDL = 3.14*s$$

$$EQL = 5*MDL$$

where:

s = the standard deviation of the concentration of the concentration calculated for the seven replicate spikes.

Given s = .706 for the seven samples, the MDL and EQL are calculated as follows, MDL and PQL values are rounded to one place.

$$MDL = 3.14 * 1.13 = 3.6 \text{ pg/ul}$$

$$EQL = 5 * 2.22 = 17.8 \text{ pg/ul}$$

Based on the 2.5 mL extraction volume and assuming a sample volume of 4.32 m<sup>3</sup> (3 lpm for 24 hours) the ambient concentration of diazinon at the EQL is :

$$(17.8 \text{ ng/mL})(2.5 \text{ mL}) / (4.32 \text{ m}^3) = 10.3 \text{ ng/m}^3 \text{ per 24-hour sample}$$

#### D. COLLECTION AND EXTRACTION EFFICIENCY (RECOVERY)

62.5 ng of diazinon standard were spiked on the primary section of each of six XAD-2 sampling tubes. The spiked tubes were then subjected to an air flow of 3 lpm for 24 hours. The samplers were set-up at 13th and T St. in Sacramento at an ambient temperature of approximately 30°C (maximum). The primary sections were then extracted with ethyl acetate and analyzed. Percent recoveries of diazinon from primary sections of three tubes analyzed within one week of sampling were 72.8%, 72.9%, 65.1% with an average of 70.3% and the percent recoveries of three tubes analyzed within two weeks of sampling were 53.5%, 57.0%, and 64.2% with an average of 58.3%.

#### E. STORAGE STABILITY

Storage stability studies were conducted over a 4 week period. The primary sections of 19 tubes were spiked with 62.5 ng of diazinon. The spiked tubes were stored in the freezer at -20°C and extracted/analyzed on storage weeks 1,2,3 and 4. Four tubes were analyzed on week 1 and 5 tubes each were analyzed on weeks 2, 3, and 4. The storage recoveries (average results) were 107.3%, 76.8%, 61.3% and 74.0% for weeks 1,2,3 and 4 respectively.

A second set of fifteen tubes were spiked with 1250 ngs of diazinon. The spiked tubes were stored in the freezer at -20°C and extracted/analyzed on storage weeks 1, 3 and 4. Five tubes each were analyzed on week 1, 3, and 4. The storage recoveries (average results) were 87.7%, 71.5%, and 87.9% respectively.

#### F. BREAKTHROUGH

The primary sections of four tubes were spiked with 750 ng diazinon/tube then run for 24 hours at 3 lpm (see Section D above). No diazinon was detected in the back-up resin bed of any of the tubes.

#### G. Safety

Diazinon is slightly to moderately toxic. As an organophosphate pesticide, it is an acetylcholinesterase inhibitor. The LD50 ranges from 2.75 mg/kg/day to nearly 450 mg/kg/day for rats. The NOEL: is 0.01mg/kg/day for rats, 0.02mg/kg/day for monkeys, and 0.02mg/kg/day for humans. The ADI is 0.002 mg/kg/day. The TLV-TWA is 0.1 mg/m<sup>3</sup>. The RfD is 0.00009 mg/kg/day. Proper protection should be taken when handling samples and standards in the laboratory. Gloves and eye protection shall be worn. Sample preparation shall be performed in a hood.

Hewlett Packard 8200 autosampler

Detector: 280°C

Injector: 250°C

Injector Liner: Double goose neck liner with glass wool

Column: J&W Scientific DB-17MS, 30 meter, 0.25 mm i.d., 0.25 um film thickness.

Pre-column: J&W Scientific deactivated fused silica, 2 meter, 0.25 mm i.d.

GC Temp. Program: Initial 50°C, hold 5 min., to 220°C @ 25°C/min., hold 2 min., to 280°C @ 5°C/min., hold 1 min.

Injector:

Pressure Pulse: Initial 6.4 psi, to 40 psi @ 99 psi/min, hold 1.31 min, to 6.4 psi @ 99 psi/min

Splitless: Purge on 2 min.

Gas Flows:

Column: Linear velocity: 32 cm/sec, electronic pressure control (6.4 psi @ 50 °C).

Auto Sampler:

Sample washes - 1, Sample pumps - 4, Sample Volume - 4 stops, Viscosity delay - Zero sec, Solvent A washes - 4, Solvent B washes - 4

Mass Spectrometer:

Electron Ionization

Selective Ion Monitoring; diazinon -304 (quant. ion, 100%), 137 (qual. ion, 50%), 179 (qual. ion, 120%). Diazinon-D<sub>10</sub> - 314 (quant. ion, 100%), 183 (qual. ion, 40%).

Tuning: PFTBA

## B. AUXILIARY APPARATUS:

1. Glass amber vials, 8 mL capacity.
2. Glass amber vials, 4 mL capacity.
3. Vial shaker, SKC, or equiv.
4. Sonicator, Branson 2210

APPENDIX III

PESTICIDE USE RECOMMENDATION  
AND REPORT

PESTICIDE USE RECOMMENDATION

# 22723

Field: MYERS2

UNITED AGRI PRODUCTS

Date: 01-26-98

3173 S. CHESTNUT

Proposed: 01-27-98

FRESNO, CA 93725

Expires: 02-15-98

(209) 487-1544

Completed: - -

Crop: PEACHES

Area: 40 Acres

Del Tkt#:

PO#:

PCA: JIM ASHLEY 2543

Pest. Permit#: 16-98-16-00477

SITE: 2 S/DENVER & BOUNDARY RD

County#: CA16 Section: 26-

Township: 17S -

Soil Texture: SANDY LOAM

Soil pH: 6.8

\*\*\*\*\*

Recommendation#: 22723

Proposed Treatment: 40 Acres

Grower: ROY MYERS

8481 FLINT AVE.

HANFORD, CA 93230

209 582-9530

Acct#:

Applx: CRINKLAW FARM SERVICES

Fldmn: JIM ASHLEY

2543

Range: 21E -

B&M: M

Soil % Organic Matter: 1

Material

REG.#

RATE

/100 gal Band

Mat. Req.

Target Pest

SUPER 94 440 SPRAY OIL	34704-00464-AA-00000	4.00 gal Treated Ac	2.00	No	160.00 gal	SAN JOSE SCALE	Nº
DIAZINON 50% CONC	00100-00460-AA-34704	4.00 gal Treated Ac	2.00	No	160.00 lb.	Twig Borer	Nº
ASANA XL INSECTICIDE	00352-00515-AA-00000	2.50 gal Treated Ac	4.00	No	2.50 gal	PEACH TWIG BORER	Nº
NU-COP 50DF	51036-00269-AA-00000	100.00 lb Treated Ac	5.00	No	100.00 lb.	SHOT HOLE	Nº

Apply by: GROUND

Gallons of Diluent/Treated Acres= 200

SPECIAL INSTRUCTIONS

SUPER 94 440: USE SPECIAL CONCENTRATE SPRAY EQUIPMENT FOR THIS APPLICATION.  
DIAZINON: APPLY AS A DORMANT SPRAY.

Mix with: 2-3 GALS DORMANT OIL OR 1-1.5 SUPERIOR OIL PER 100 GALS OF WATER. DO NOT EXCEED 6 GALS OIL/A.

ASANA: APPLY NO MORE THAN .3 LBS AI PER SEASON BETWEEN BLOOM AND HARVEST.

NU-COP 50DF: APPLY AT LEAF FALL.

Growth Stage(s): DORMANT APPLICATION

\*\*\*\*\* PRECAUTIONS \*\*\*\*\*

\*Restricted: YES, CERTIFIED APPLR ONLY

Days to Harvest: 21

Permit Required: NO

Avoid Drift: YES

Notice of Intent Required: NO

Avoid Water Contamination: YES

Chemical Category: I DANGER

Toxic to Bees: YES \*

Closed Mixing System Required: NO

Toxic to Fish: YES

Posting Required: NO

Toxic to Birds: YES

Non Re-entry Interval: 5.00 DAYS

Feed/Graze Treated Area/Crop: NO

\*NOTIFY BEEKEEPERS AT LEAST 48 HRS BEFORE APPLICATION

CRITERIA / ENVIRONMENTAL CHANGES

1. PEST PRESENT
2. WEAR PROTECTIVE CLOTHING
3. READ & FOLLOW ALL LABEL/MIXING INSTRUCTIONS
4. DO NOT ALLOW DRIFT AWAY FROM TARGET FIELD
5. APPLICATOR SHOULD NOTE ANY DRIFT HAZARDS IN AREA

SEQUESTERED ZINC 75 @ 1/2 GAL PER ACRE

The execution of this recommendation certifies that alternative and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.

NW	N	NE
W	Target	E
SW	S	SE

\*\*\*ALL RESTRICTED MATERIALS TO BE APPLIED/STORED BY PCO ONLY\*\*\*

JIM ASHLEY

2543

Signature:

Grower Signature:

MYERS2

Copyright 1984-1996 CDMS, Inc. SE# AN0086

=READ THE LABEL=

\*\*\* RECOMMENDATION CONTINUED ON NEXT PAGE \*\*\*

1 (9.44) user: CRINKLAW FARM SERVICES

STATE OF CALIFORNIA - ENVIRONMENTAL PROTECTION AGENCY  
DEPARTMENT OF PESTICIDE REGULATION  
PESTICIDE USE REPORT (33-025 Rev 3/90) PMIS 0033

14193

1. # DF98-53

## 1 NURSERY

COUNTY	SECTION	TOWNSHIP	RANGE	BASE & MERIDIAN	METHOD	PERMITTEE / CUSTOMER	APPLICATOR NAME AND ADDRESS
16	26	175	21E			ROY C. MYERS	CRINKLAW FARM SERVICES, INC.
PERMITTEE IDENTIFICATION NUMBER						SITE IDENTIFICATION NUMBER	PLANTED AREA
3-98-160477						2	40.00 ACRE
LOCATION						BLOCK ID:	
S/O DENVER AT BOUNDARY RD							
DATE / TIME APPLIED		AREA TREATED		COMMODITY OR SITE TREATED			
proposed		Actual					
01-27-98/01:45		40.00 ACRE		PEACHES			

RESTRICTED MATERIAL	CHEMICAL NUMBER	PRODUCT AND MANUFACTURER	REGISTRATION NUMBER FROM LABEL	TOTAL FORMULATED PRODUCT USED AND UNITS	RATE PER ACRE	DILUTION VOLUME GAL/ACRE
NO		SUPER 94 440 SPRAY OIL CLEAN CROP	34704-464	160.00 GAL	4.00 GAL	200.00
YES		DIAZINON 50W CLEAN CROP	100-460-AA-34704	160.00 LB	4.00 LB	200.00
		ASANA XL E.I. DUPONT CO	352-S15	2.50 GAL	8.00 OZ	200.00
NO		NU-COP 50DF MICRO FLO. CO.	51036-00269-AA	400.00 LB	10.00 LB	200.00

HOURS REENTRY	DAYS PREHARVEST	APPLICATION SUPERVISED BY	NW	N	NE
5 DAYS	21 DAYS	DALE CHRISTIAN			
ENVIRONMENTAL CHANGES / COMMENTS					
REC#22723					
				TREATMENT AREA	
SUBMITTED BY:	DATE	TIME	PCA NAME		
DAVE CRINKLAW	01-29-98	10:25	JIM ASHLEY	SW	SE
RECEIVED BY:	BOX NO.	DATE	TIME	APPROVED	
				DENIED	

APPENDIX IV

DPR's  
MONITORING RECOMMEDATIONS FOR DIAZINON

# Memorandum

To : George Lew, Chief  
Engineering and Laboratory Branch  
Monitoring and Laboratory Division  
Air Resources Board  
600 North Market Boulevard  
Sacramento, California 95812

Date : October 31, 1995

Place :

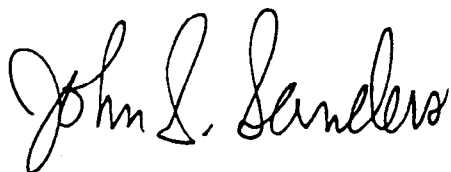
From : Department of Pesticide Regulation - 1020 N Street, Room 161  
Sacramento, California 95814-5624

Subject : MONITORING RECOMMENDATION FOR DIAZINON

Attached is the Department of Pesticide Regulation's recommendation for monitoring the insecticide diazinon. This recommendation is made pursuant to the requirements of Assembly Bills 1807 and 3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5). As you know, monitoring recommendations are made from historical use information for the pesticide in question. For this reason, it is essential that the agricultural commissioner, of the county where monitoring will be performed, be consulted prior to the onset of air monitoring.

We anticipate the submission of air monitoring data by March, 1997.

If you have any questions please contact Kevin Kelley, of my staff, at (916) 324-4187.



John S. Sanders, Chief  
Environmental Monitoring and  
Pest Management Branch  
(916) 324-4100

attachment

cc: Paul H. Gosselin, DPR  
Ronald J. Oshima, DPR  
Gary T. Patterson, DPR  
Charles M. Andrews, DPR  
John Donahue, DPR  
Barry Cortez, DPR  
Cosmo C. Insalaco,

Jay Schreider, DPR  
Madeline Brattesani, DPR  
Kevin Kelley, DPR  
Genevieve Shiroma, ARB  
Don Fitzell, ARB ✓  
Cara Roderick, ARB

Fresno County Agricultural Commissioner



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SURNAME

049

State of California  
Department of Pesticide Regulation  
1020 N Street  
Sacramento, California 95814-5624

Staff Report

**USE INFORMATION AND AIR MONITORING RECOMMENDATION  
FOR THE PESTICIDAL ACTIVE INGREDIENT DIAZINON**

October 1995

Principal Author

Kevin C. Kelley  
Associate Environmental Research Scientist

## MONITORING RECOMMENDATION FOR DIAZINON

### BACKGROUND

In order to fulfill the requirements of AB 1807/3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5), the Department of Pesticide Regulation (DPR) has previously requested that the Air Resources Board (ARB) document the airborne concentrations of the pesticide diazinon [O,O-Diethyl O-(6-methyl-2-(1-methylethyl)-4-pyrimidinyl) phosphorothioate]. This recommendation provides background and recent use information on diazinon containing products, and identifies how they are used.

Pure diazinon (CAS: 333-41-5) is a clear colorless liquid with a faint ester-like odor. Technical grades are yellow. Diazinon has a molecular formula of  $C_{12}H_{21}N_2O_3PS$ , a formula weight of 304.35 g/mole, and a specific density of 1.116-1.118 at 20 °C. It has a water solubility of 71.1, 53.5, and 43.7 mg/L at 10, 20, and 30 °C respectively, a Henry's Constant of  $1.13 \times 10^{-7}$  atm·m<sup>3</sup>/mol at 20 °C, and a vapor pressure of  $8.47 \times 10^{-5}$  mmHg at 20 °C. Diazinon is miscible with a variety of organic solvents.

The hydrolysis half-life ( $t_{1/2}$ ) of diazinon in water (20 °C) is 11.8 hours (pH 3.1); 185 days (pH 7.4); 136 days (pH 9.0) and 6 days (pH 10.4). Reported soil half-lives following incubation of 10 ppm diazinon are 12.5 weeks (sterile sand loam); 6.5 weeks (sterile organic soil); < 1 week (non-sterile sand loam); and 2 weeks (non-sterile organic soil). Exposure of diazinon to UV light produces hydroxydiazinon. The photolytic  $t_{1/2}$  for this reaction, in aqueous buffer solution (25 °C and pH 7.0), has been calculated to be 15 days. The  $t_{1/2}$  of diazinon is approximately 3.2 weeks in a neutral solution at room temperature. Diazinon and its oxidative product diazoxon, have been found in fogwater. The distribution of diazinon (1.6 ng/m<sup>3</sup>) was 76.1% (vapor phase); 19.8% (dissolved phase); 3.7% (air particles); and 0.4% (water particles). The distribution of diazoxon was 13.4%, 81.7 %, 4.9%, and 0.02% respectively.

The acute oral LD<sub>50</sub> of diazinon for rats ranges from 240 to 480 mg/kg. The LC<sub>50</sub> (96 hour) for rainbow trout is 16 mg/L, and 2.6 to 3.2 mg/L for bluegill sunfish. The OSHA 8-hour time weighted average for a personal exposure limit is 0.1 mg/m<sup>3</sup>. Diazinon has entered the risk assessment process at DPR under the SB 950 (Birth Defect Prevention Act of 1984) based on its potential for reproductive and mutagenic adverse health effects.

### USE OF DIAZINON

As of September 1, 1995, there were 254 active registrations for products containing diazinon. These products consist of ear tags for cattle, flea and tick collars for pets, home use products for the control of lawn insects, and agricultural products. Formulations of diazinon include impregnated plastics (flea collars, ear tags), granular, aqueous and emulsifiable concentrates, wettable powders, dusts, flowables, microcapsules, and fumigants. The Signal Words on products

which contain 25% or more diazinon are "Warning"; products containing 15% or less (most home use products) are labeled "Caution".

Diazinon use for 1993, 1992, and 1991 is summarized in the following tables: Table 1, Diazinon Use by Year; and Table 2, Diazinon Applications in Fresno County. Agricultural use of diazinon for the eleven counties listed in Table 1 accounts for 50 to 65% of total diazinon use. The remaining 50 to 35% of use is split fairly evenly between agricultural use (in counties not listed in table 1), and non-agricultural use (structural pest control, landscape maintenance, pet, and livestock products).

Table 1. Diazinon Use by Year (Pounds of Active Ingredient)

County	1993	1992	1991
Butte	73,471.1	48,689.7	31,531.7
Fresno	219,186.5	168,455.9	135,231.5
Imperial	56,015.7	58,023.1	76,784.5
Kern	99,782.7	93,528.8	46,674.7
Madera	57,010.6	70,221.9	52,411.4
Merced	43,664.6	60,883.9	31,968.0
Monterey	65,637.4	44,090.8	36,527.8
San Joaquin	46,929.3	54,465.8	26,974.9
Stanislaus	85,818.4	54,444.7	25,682.1
Sutter	49,905.9	50,008.9	19,518.6
Tulare	120,432.2	50,145.6	31,544.5
County Totals	917,854.4	752,959.1	514,849.7
CALIFORNIA TOTAL	1,491,709.59	1,347,155.52	1,007,021.85

The data summarized in table 1 show that the largest applications of diazinon routinely occur in Fresno County. Additionally, these data show that the greatest applications generally occur during January and February of each year (Table 2).

Diazinon is used as a dormant spray for the control of Lepidopterous insects, scale, mites, and aphid pests of fruit and nut trees. Diazinon is also applied during the spring for the control of different Lepidopterous insects, but at rates much lower than dormant spray rates. Dormant rates range from 3.9 lbs AI/acre (plums,) to 2.1 lbs AI/acre (apricots). Diazinon is also applied during this period (January-February) to cherries, apples, lettuce, walnuts, and greenhouse or nursery plants. Diazinon use on these commodities is minimal compared with applications to plums, almonds, peaches, and nectarines.

Table 2. Diazinon applications in Fresno County (Pounds of Active Ingredient)

Fresno County	1993	1992	1991
January (lbs AI)	73,717.7	38,375.2	17,731.7
(Rate)	2.7	1.94	2.22
February (lbs AI)	40,617.2	17,199.2	28,214.9
(Rate)	2.12	1.66	4.02

## RECOMMENDATIONS

### *Ambient Air Monitoring*

The use patterns for diazinon suggest that monitoring should take place in Fresno County during a 30- to 45-day sampling period in the months of January or February. Three to five sampling sites should be selected in relatively high-population areas or in areas frequented by people. Sampling sites should be in almond and/or stone fruit growing areas but not immediately adjacent to fields to which diazinon is being applied. At each site, twenty to thirty discrete 24-hour samples should be taken during the sampling period. Background samples should be collected in an area distant to diazinon applications.

Replicate (co-located) samples are needed for five dates at each sampling location. Two co-located samplers (in addition to the primary sampler) should be run on those days. The date chosen for replicate samples should be distributed over the entire sampling period. They may, but need not be, the same dates at every site. Field blank and spike samples should be collected at the same environmental (temperature, humidity, exposure to sunlight) and experimental (air flow rates) conditions as those occurring at the time of ambient sampling. Since diazinon is known to partition into fogwater, samples collected during fog episodes should be designated as such.

### *Monitoring of an Application Site*

The use pattern for diazinon suggests that application-site monitoring should be conducted during the months of January or February in Fresno County, and that the monitoring be associated with applications of diazinon to almonds or stone fruits. Due to the extensive use of diazinon on these crops during this period, care should be taken so that other applications to nearby groves during the sampling period do not affect sample collection. A three day monitoring period should be established with sampling times as follows: Application + 1 hour,

followed by one 2-hour sample, one 4-hour sample, two 8-hour samples, and two 24-hour samples. A minimum of four samplers should be positioned, one on each side of the field. A fifth sampler should be co-located at one position. Since diazinon is extensively used in the area, background samples should collect enough volume (either 12 hours at 15 liters/min., or a shorter period with a higher volume pump) to permit a reasonable minimum detection level. Ideally, samplers should be placed a minimum of 20 meters from the field. Field blank and field spike samples should be collected at the same environmental (temperature humidity, exposure to sunlight) and experimental (similar air flow rates) conditions as those occurring at the time of sampling.

We also request that you provide in the monitoring report: 1) An accurate record of the positions of the monitoring equipment with respect to the field, 2) an accurate drawing of the monitoring site showing the precise location of the meteorological equipment, trees, buildings, etc., 3) meteorological data collected at a minimum of 15 minute intervals including wind speed and direction, humidity, and comments regarding degree of cloud cover, and 4) the elevation of each sampling station with respect to the field, and the orientation of the field with respect to North (identified as either true or magnetic north). Samples collected during fog episodes should be designated as such.

**APPENDIX V**

**APPLICATION AND AMBIENT FIELD LOG SHEETS**

# LOG BOOK

Project: Diazinon Application; Fresno Co.

January, 1998

Project #: C97-070

Log #	Sample ID	Date	Time	Comments	weather o = overcast pc = partly cloudy k = clear   taken by	
1	DIAZ- EB	1/26/98	1515	Roto # 11A Background	O	KEH
		1/26/98	0930			
2	-EFS1	1/26/98	1715	Roto # 11B Field Spike		
		1/26/98	0930			
3	-NB	1/26/98	1705	Roto # 4A		
		1/26/98	0950			
4	-NFS <sup>4</sup>	1/26/98	1705	Roto # 4B		
		1/26/98	0950			
5	-WB	1/26/98	1655	Roto # 12		
		1/26/98	0940			
6	-WFS3	1/26/98	1655	Roto # 13		
		1/26/98	0940			
7	-SB	1/26/98	1645	Roto # 10A		
		1/26/98	0935			
8	-SFS2	1/26/98	1645	Roto # 10B		
		1/26/98	0935			
9	-TB	1/27/98	0930	Trip Blank		
10	E1	1/24/98	0930		K	
		1/24/98	1450			
11	E1D	1/24/98	0930			
		1/24/98	1450			
12	S1	1/25/98	0935			
		1/25/98	1455			
13	W1	1/25/98	0940			
		1/25/98	1500			
14	N1	1/25/98	0950		K	
		1/25/98	1505			
15	E2	1/25/98	1450			
		1/25/98	1650			
16	E2A	1/25/98	1450			
		1/25/98	1650			
17	S2	1/25/98	1435			
		1/25/98	1655			
18	W2	1/25/98	1520			
		1/25/98	1700			
19	N2	1/25/98	1505			
		1/27/98	1705			
20	E3	1/27/98	1650			
		1/27/98	2105			
21	E3A	1/27/98	1650			
		1/27/98	2105			
22	S3	1/27/98	1655			
		1/27/98	2110			

**LOG BOOK**  
**Project: Diazinon Application; Fresno Co.**  
**January, 1998**  
**Project #: C97-070**

Log #	Sample ID	Date	Time	Comments	weather o = overcast pc = partly cloudy k = clear   taken by	
23	DIAZ-WB	1/27	1700			
		1/27	2115			
24	NE	1/27	1505			
		1/27	2120			
25	SE	1/27	2105			
		1/27	0520			
26	EW	1/27	2108			
		1/27	0520			
27	SE	1/27	2110			
		1/27	0530			
28	WB	1/27	2115			
		1/27	0535			
29	SE	1/27	2120			
		1/27	0540			
30	SE	1/28	0520		Fog	
		1/28	1250			
31	EW	1/28	0520			
		1/28	1250			
32	SE	1/28	0530			
		1/28	1300			
33	NE	1/28	0535			
		1/28	1312			
34	NE	1/28	0540			
		1/28	1320			
35	E6	1/28	1250		PC	
		1/29	1115			
36	E6D	1/28	1250			
		1/29	1110			
37	S6	1/28	1300			
		1/29	1115			
38	WB	1/28	1312			
		1/29	1150			
39	N6	1/28	1320		RAINERS	
		1/29	1200			
40	E7	1/29	1130		OC	
		1/29	1140			
41	EW	1/29	1120			
		1/29	1145			
42	S7	1/29	1155			
		1/29	1150			
43	W7	1/29	1155			
		1/29	1200			
44	N7	1/30	1130			

**Project #: C97-070**

05'

**LOG BOOK**  
 Project: Diazinon Ambient; Fresno Co.  
 January, 1998  
 Project #: C97-069

R = Fog  
 C = V.M.

Log #	Sample ID	Date	S <sub>min</sub> Time	B = color 7 as per NEM Comments	weather. o = overcast pc = partly cloudy k = clear   taken by
1	AAB 1	1/12/98	1220	Roto # <del>1A</del> 1A + 7B	O C
2	PAR 1	1/12/98	1237	Roto # 1A + 1B	O C
3	REE 1	1/12/98	1230	Roto # 12A + 12B	C C
4	CEN 1	1/12/98	1233	Roto # 3A + 3B	O C
5	SAN 1	1/12/98	1230	Roto # 2A + 2B	O C
6	ARB 2	1/13/98	0830		O C
7	PAR 2	1/13/98	0930		O C
8	REE 2	1/13/98	1000		O C
9	CEN 2	1/13/98	1030		O C
10	SAN 2	1/13/98	1050		O C
11	ARB 3	1/14/98	0915	Roto # 7A STP F 3.0	PC C
12	ARB 3D	1/14/98	0915	Roto # 7B STP F 3.0	PC C
13	PAR 3	1/14/98	0930	Roto # 1A STP F 3.2	PC C
14	PAR 3D	1/14/98	0930	Roto # 1B STP F 3.0	PC C
15	REE 3	1/15/98	0945	Roto # 12A STP F 3.0	K C
16	REE 3D	1/15/98	0945	Roto # 12B STP F 3.0	K C
17	CEN 3	1/15/98	1209	Roto # 3A STP F 3.0	O C
18	CEN 3D	1/15/98	1209	Roto # 3B STP F 3.0	O C
19	SAN 3	1/15/98	1233	Roto # 2A STP F 2.8	O C
20	SAN 3D	1/15/98	1233	Roto # 2B STP F 2.9	O C
21	ARB 4	1/15/98	0900	Roto # 7B STP F = 3	Cloudy PS
22	PAR 4	1/15/98	0945	Roto # 1A STP F = 3	" PS

**LOG BOOK**  
 Project: Diazinon Ambient; Fresno Co.  
 January, 1998  
 Project #: C97-069

Log #	Sample ID	Date	Time	Comments	weather O = overcast pc = partly cloudy k = clear   taken by	
23	REE4	01-15-98	10:09	Roto 12A Str Flow 3.0 Stop Flow 3.0	"	PS
24	CEN4	01-15-98	12:09	Roto 3A Str Flow 3.0 Stop Flow 3.0	"	PS
25	SAN4	01-15-98	12:33	Roto 2A Str Flow 3.0 Stop Flow 3.0	"	PS
26	TB4	01-16-98	11:30	<i>Trip Blank</i>	"	PS
27	ARB5	01-20-98	08:30	Roto 7A Str 3 Str	K/1-3	PS
28	PAR5	01-20-98	10:30	Roto 1A Str 3 Stop 3	"	PC
29	REE5	01-20-98	11:00	Roto 1A Str 3 Stop 3	"	PC
30	CEN5	01-20-98	11:15	Roto 3A Str 3 Stop 3	"	PS
31	SAN5	01-21-98	11:30	Roto 3A Str 3 Stop 3	"	PS
32	ARB6	01-22-98	6:00	Roto 7A Str 3 Stop 3	fog/fog	PC
33	ARB6D	01-22-98	8:00	Roto 7A Str 3 Stop 3	"	PC
34	PAR6	01-22-98	10:25	Roto 1A Str 3 Stop 3	"	PC
35	PAR6D	01-22-98	12:25	Roto 1B Str 3 Stop 3	"	PC
36	REE6	01-22-98	10:45	Roto 12A Str 3 Stop 3	"	PC
37	REE6D	01-22-98	10:45	Roto 12B Str 3 Stop 3	"	PC
38	CEN6	01-22-98	11:07	Roto 3A Str 3 Stop 11	"	PC
39	CEN6D	01-22-98	11:07	Roto 3B Str 3 Stop 11	"	PC
40	SAN6	01-22-98	11:22	Roto 2A Str 3 Stop 11	"	PC
41	SAN6D	01-22-98	11:22	Roto 2B Str 3 Stop 11	"	PC
42	ARB7	01-22-98	8:15	Str 3 * Stop 2.8	fog/fog	PC
43	PAR7	01-22-98	10:30	Str 3 Stop 3.01	"	PC
44	REE7	01-22-98	10:45	Str 3 Stop 3	"	PC
45	CEN7	01-22-98	11:07	Str 3 Stop 3	"	PC
46	SAN7	01-22-98	11:22	Str 3 Stop 3	"	PC

46B TB7 01-22 *Trip Blank*

**LOG BOOK**  
 Project: Diazinon Ambient; Fresno Co.  
 January, 1998  
 Project #: C97-069

Log #	Sample ID	Date	Time	Comments	weather o = overcast pc = partly cloudy k = clear   taken by
47	ARB8	1-26	12:20	Roto 7A STR 3	K / PS
		1-27	11:50		
48	PAR 8	1-26	13:10	" 1A STR 3	" DW
		1-27	12:30		
49	REE8	1-26	13:40	" 12A STR 3	" DW
		1-27	12:50		
50	CEN8	1-26	14:00	" 3A STR 3	" DW
		1-27	13:20		
51	SAN8	1-26	14:15	" 2A STR 3	" DW
		1-27	13:40		
52	ARB9	1-27	11:50	Roto 7A STR 3	K PS
		1-28	11:50		
53	PAR9	1-27	12:30	" 1A STR 3	" PS
		1-28	12:55		
54	REE9	1-27	13:50	" 12A STR 3	" PS
		1-28	13:57		
55	CEN9	1-27	13:20	" 3A STR 3	" PS
		1-28	13:26		
56	SAN9	1-27	13:40	" 2A STR 3	" PS
		1-28	13:40		
57	ARB10	1-26	12:50	(210)10 Roto 7A STR 3	K/Rain PS
		1-29	12:50		
58	ARB10B	1-26	12:50	(210)10 7B STR 3	" PS
		1-29	12:50		
59	PAR10	1-26	12:30	" 1A STR 3	" PS
		1-29	12:30		
60	PAR10B	1-26	12:30	" 1B STR 3	" PS
		1-29	12:30		
61	REE10	1-28	12:50	" 12A STR 3	" PS
		1-29	11:40		
62	REE10B	1-28	12:50	" 12B STR 3	" PS
		1-29	12:50		
63	CEN10	1-28	13:20	" 3A STR 3	" PS
		1-29	13:20		
64	CEN10B	1-28	13:20	" 3B STR 3	" PS
		1-29	13:20		
65	SAN10	1-28	13:40	" 2A STR 3	" PS
		1-29	12:30		
66	SAN10B	1-28	13:40	" 2B STR 3	" PS
		1-29	12:30		
67	ARB11	1-29	13:50	7A STR 3	Rain/K PS
		1-30	13:50		
68	PAR11	1-29	11:30	11/27B STR 3	" " PS
		1-30	12:30		

**LOG BOOK**  
 Project: Diazinon Ambient; Fresno Co.  
 January, 1998  
 Project #: C97-069

Log #	Sample ID	Date	Time	Comments	weather o = overcast pc = partly cloudy k = clear   taken by
69	REE 11	1-29 1140 1-30 1250	12 A	str 3 str "	Rainy/k PS
70	CEN 11	1-29 1206 1-30 1313	3 A	str 3 str "	" " PS
71	SAN 11	1-29 1230 1-30 1330	2 A	str 3 str "	" " PS
72	TB 11	1-29 1-30	Trip Blank		" " PS
73	ARB 12	02-02 1220 " 1220	7 A	str 3 str 3	RAIN DW
74	PAR 12	02-02 1400 " 1400	11 A	str 3 str 3	" DW
75	REE 12	02-02 1315 02-03 1433	12 A	str 3 str 3	" DW
76	CEN 12	02-02 1450 02-03 1450	3 P	str 3 str 3	" DW
77	SAN 12	02-02 1525 02-03 1525	1 P	str 3 str 3	" DW
78	TB 12	02-02 02-03	Trip Blank		
79	TS 1		Trip Spike		
80	TS 2		" "		
81	TS 3		" "		
82	TS 4		" "		
83	TS 5		" "		
84	FS 1	1/15/98 0900 1/16/98 0906	Field Spike	Rot. 7A Str. 3	Cloudy Raining
85	FS 2	1/15/98 0900 " 0900	" "	Rot. 5B Str. 3	"
86	FS 3	1/15/98 0900 " 0900	" "	Rot. 5A Str. 3	"
87	FS 4	1/15/98 0900 " 0900	" "	Rot. 9A Str. 3	"
88	FS 5	1/15/98 0900 " 0900	" "	Rot. 9B Str. 3	"

QA/QC

APPENDIX VI

DIAZINON APPLICATION METEOROLOGICAL DATA

**Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	26	1705	0.0	55	1006	66	19
1998	26	1719	0.0	55	1006	77	49
1998	26	1733	0.1	55	1005	81	107
1998	26	1748	2.0	55	1005	85	105
1998	26	1803	2.0	54	1005	85	121
1998	26	1818	1.6	55	1005	83	111
1998	26	1833	0.7	55	1005	82	121
1998	26	1848	0.0	54	1005	80	119
1998	26	1903	0.0	54	1006	78	143
1998	26	1918	0.7	54	1006	77	160
1998	26	1933	3.1	53	1006	82	138
1998	26	1948	2.6	53	1006	85	150
1998	26	2003	2.0	53	1006	86	162
1998	26	2018	3.8	53	1006	88	148
1998	26	2033	0.5	52	1006	89	233
1998	26	2048	0.0	51	1006	89	230
1998	26	2103	0.0	50	1007	91	154
1998	26	2118	0.0	50	1007	94	131
1998	26	2133	0.1	49	1007	95	121
1998	26	2148	2.5	49	1006	97	118
1998	26	2203	6.5	49	1006	97	119
1998	26	2218	3.8	48	1007	98	227
1998	26	2233	1.6	48	1007	98	178
1998	26	2248	1.4	47	1007	99	80
1998	26	2303	0.0	47	1007	100	116
1998	26	2318	2.3	47	1007	100	103
1998	26	2333	3.1	47	1007	100	105
1998	26	2348	3.3	47	1007	100	118
1998	27	3	3.4	48	1006	100	109
1998	27	18	3.1	48	1006	100	104
1998	27	33	5.7	48	1006	99	103
1998	27	48	5.0	48	1006	98	106
1998	27	103	3.8	48	1006	99	93
1998	27	118	1.6	48	1007	99	97
1998	27	133	4.1	48	1006	100	91
1998	27	148	4.1	48	1006	99	94
1998	27	203	5.3	48	1006	99	98
1998	27	218	5.1	49	1006	99	107
1998	27	233	3.6	49	1006	97	112
1998	27	248	1.1	49	1006	96	99
1998	27	303	0.0	48	1006	96	215
1998	27	318	0.0	48	1006	97	136
1998	27	333	0.0	48	1006	98	69

**Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	27	348	0.0	48	1006	98	113
1998	27	403	0.0	47	1006	100	110
1998	27	418	0.0	47	1006	100	64
1998	27	433	0.0	47	1006	100	287
1998	27	448	0.0	47	1006	100	324
1998	27	503	0.0	47	1005	100	60
1998	27	518	0.0	46	1005	100	110
1998	27	533	0.0	46	1005	100	122
1998	27	548	0.0	47	1005	100	110
1998	27	603	0.0	46	1005	100	108
1998	27	618	0.0	46	1005	100	114
1998	27	633	0.8	45	1005	100	124
1998	27	648	3.9	45	1005	100	113
1998	27	703	0.3	45	1005	98	86
1998	27	718	0.0	44	1006	99	119
1998	27	733	2.2	44	1006	100	128
1998	27	748	0.1	45	1006	100	132
1998	27	803	1.3	47	1006	99	97
1998	27	818	3.0	48	1006	94	100
1998	27	833	3.6	48	1006	91	97
1998	27	848	3.6	47	1006	89	110
1998	27	903	1.3	47	1007	92	93
1998	27	918	0.1	49	1007	93	132
1998	27	933	2.0	50	1007	92	95
1998	27	948	6.1	53	1007	85	109
1998	27	1003	6.2	53	1006	79	116
1998	27	1018	4.3	53	1007	79	112
1998	27	1033	2.5	54	1007	79	129
1998	27	1048	4.0	56	1007	76	129
1998	27	1103	5.5	57	1007	72	105
1998	27	1118	6.3	58	1007	68	118
1998	27	1133	6.7	59	1006	66	116
1998	27	1148	6.2	60	1006	66	116
1998	27	1203	5.3	61	1006	64	123
1998	27	1218	4.5	62	1006	63	161
1998	27	1233	4.2	62	1005	64	170
1998	27	1248	3.7	63	1005	62	175
1998	27	1303	2.7	63	1005	61	201
1998	27	1318	4.2	62	1005	62	261
1998	27	1333	3.3	63	1005	66	258
1998	27	1348	0.4	63	1005	64	260
1998	27	1403	0.0	65	1004	61	279
1998	27	1418	0.0	66	1004	60	267

**Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	27	1433	0.0	67	1004	59	106
1998	27	1448	0.0	67	1004	59	140
1998	27	1503	0.0	67	1004	57	118
1998	27	1518	0.1	67	1004	58	147
1998	27	1533	0.0	67	1004	58	285
1998	27	1548	0.0	68	1004	58	222
1998	27	1603	0.0	67	1004	57	178
1998	27	1618	0.0	65	1004	59	208
1998	27	1633	0.0	64	1004	61	216
1998	27	1648	0.0	63	1004	64	199
1998	27	1703	0.0	62	1004	67	179
1998	27	1718	0.0	61	1004	69	171
1998	27	1733	0.0	60	1004	73	121
1998	27	1748	0.0	59	1004	75	120
1998	27	1803	0.0	58	1004	78	194
1998	27	1818	0.0	56	1004	82	221
1998	27	1833	0.0	56	1004	86	111
1998	27	1848	0.0	56	1004	87	85
1998	27	1903	0.0	55	1004	89	67
1998	27	1918	0.0	53	1005	90	192
1998	27	1933	0.0	53	1005	94	169
1998	27	1948	0.2	53	1005	95	278
1998	27	2003	1.2	52	1005	97	331
1998	27	2018	0.0	52	1005	97	142
1998	27	2033	0.0	51	1005	99	287
1998	27	2048	0.0	51	1005	100	297
1998	27	2103	0.0	52	1005	100	325
1998	27	2118	0.0	52	1005	100	330
1998	27	2133	0.0	52	1005	100	264
1998	27	2148	0.0	52	1005	100	295
1998	27	2203	0.0	51	1005	100	285
1998	27	2218	0.0	52	1005	100	280
1998	27	2233	0.0	51	1005	100	298
1998	27	2248	0.0	51	1005	100	315
1998	27	2303	2.6	50	1005	100	283
1998	27	2318	3.0	50	1005	100	284
1998	27	2333	1.1	50	1005	100	283
1998	27	2348	0.0	49	1006	100	292
1998	28	3	1.3	49	1006	100	309
1998	28	18	0.3	48	1006	100	308
1998	28	33	1.4	49	1006	100	315
1998	28	48	0.2	49	1006	100	330
1998	28	103	0.6	48	1006	100	319

**Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	28	118	0.3	48	1006	100	281
1998	28	133	0.7	47	1006	100	153
1998	28	148	0.1	47	1006	100	26
1998	28	203	0.0	46	1006	100	257
1998	28	218	0.0	47	1006	100	300
1998	28	233	0.0	47	1006	100	233
1998	28	248	0.0	47	1005	100	325
1998	28	303	0.0	46	1006	100	335
1998	28	318	0.5	45	1005	100	244
1998	28	333	0.0	45	1005	100	299
1998	28	348	0.0	45	1005	100	274
1998	28	403	0.0	44	1005	100	294
1998	28	418	0.0	44	1005	100	32
1998	28	433	0.0	43	1005	100	257
1998	28	448	0.0	43	1005	100	101
1998	28	503	0.1	43	1005	100	101
1998	28	518	0.6	42	1005	100	121
1998	28	533	1.0	42	1005	100	126
1998	28	548	0.1	42	1005	100	125
1998	28	603	0.2	41	1005	100	129
1998	28	618	0.4	41	1005	100	127
1998	28	633	0.3	41	1005	100	164
1998	28	648	0.2	41	1005	100	135
1998	28	703	0.5	41	1005	100	166
1998	28	718	0.0	41	1005	100	170
1998	28	733	0.3	41	1005	100	133
1998	28	748	0.1	40	1005	100	152
1998	28	803	0.0	40	1005	100	161
1998	28	818	0.4	41	1005	100	145
1998	28	833	0.5	41	1005	100	145
1998	28	848	0.3	41	1005	100	145
1998	28	903	0.7	41	1005	100	118
1998	28	918	3.6	41	1004	100	111
1998	28	933	4.8	41	1004	100	109
1998	28	948	5.3	41	1005	100	111
1998	28	1003	6.3	40	1005	100	112
1998	28	1018	5.9	40	1005	100	115
1998	28	1033	4.5	40	1005	100	120
1998	28	1048	4.5	39	1004	100	114
1998	28	1103	3.7	40	1004	100	105
1998	28	1118	2.0	41	1004	100	116
1998	28	1133	2.6	45	1004	100	97
1998	28	1148	5.5	46	1003	100	98

**Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	28	1203	5.0	48	1003	100	113
1998	28	1218	5.9	51	1003	98	120
1998	28	1233	6.1	55	1002	91	110
1998	28	1248	6.1	57	1002	84	111
1998	28	1303	4.4	58	1002	80	117
1998	28	1318	4.5	59	1002	79	106
1998	28	1333	1.6	60	1002	77	123
1998	28	1348	0.9	62	1001	75	164
1998	28	1403	0.0	63	1001	73	133
1998	28	1418	1.7	62	1001	70	98
1998	28	1433	2.1	61	1001	70	110
1998	28	1448	1.3	62	1001	70	123
1998	28	1503	0.9	63	1001	71	134
1998	28	1518	0.9	63	1001	69	151
1998	28	1533	0.3	63	1001	70	167
1998	28	1548	0.0	63	1001	72	162
1998	28	1603	0.1	62	1001	72	148
1998	28	1618	0.0	61	1001	75	128
1998	28	1633	0.2	61	1001	77	117
1998	28	1648	0.0	60	1001	78	124
1998	28	1703	0.4	60	1001	80	116
1998	28	1718	1.6	59	1001	83	108
1998	28	1733	0.2	59	1001	85	109
1998	28	1748	1.7	58	1001	87	128
1998	28	1803	1.6	58	1001	87	134
1998	28	1818	2.8	58	1001	87	135
1998	28	1833	3.3	58	1001	89	139
1998	28	1848	2.4	58	1001	91	136
1998	28	1903	0.4	57	1001	91	138
1998	28	1918	1.2	57	1001	93	144
1998	28	1933	1.6	57	1001	93	132
1998	28	1948	1.9	57	1001	93	134
1998	28	2003	0.4	57	1000	92	142
1998	28	2018	0.2	57	1001	92	151
1998	28	2033	0.2	57	1000	91	153
1998	28	2048	0.6	57	1001	89	179
1998	28	2103	1.4	56	1001	92	164
1998	28	2118	1.4	55	1000	96	157
1998	28	2133	0.7	54	1000	98	126
1998	28	2148	0.5	54	1000	99	138
1998	28	2203	0.1	54	1000	99	129
1998	28	2218	2.5	54	1000	99	106
1998	28	2233	4.5	53	1000	100	98

# **Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	28	2248	5.7	53	1000	100	103
1998	28	2303	6.8	53	1000	100	99
1998	28	2318	5.6	54	1000	100	114
1998	28	2333	6.6	54	1000	100	115
1998	28	2348	7.2	54	1000	100	107
1998	29	3	7.8	54	999	100	121
1998	29	18	7.3	54	999	100	129
1998	29	33	5.9	54	999	99	140
1998	29	48	5.4	54	999	99	137
1998	29	103	5.4	54	999	98	145
1998	29	118	5.4	54	998	96	146
1998	29	133	3.6	54	998	94	141
1998	29	148	4.3	54	998	95	143
1998	29	203	4.7	54	998	95	151
1998	29	218	5.1	54	998	93	129
1998	29	233	3.7	53	998	93	153
1998	29	248	4.9	53	998	93	123
1998	29	303	5.2	54	998	93	137
1998	29	318	6.0	54	998	93	127
1998	29	333	6.3	55	998	97	123
1998	29	348	7.8	56	998	94	176
1998	29	403	11.4	55	999	91	174
1998	29	418	8.8	54	999	96	180
1998	29	433	7.0	54	999	100	178
1998	29	448	6.3	54	999	100	182
1998	29	503	5.3	54	999	100	190
1998	29	518	5.7	54	1000	100	171
1998	29	533	5.0	54	1000	100	164
1998	29	548	4.5	54	1000	100	130
1998	29	603	7.2	54	1000	100	116
1998	29	618	7.7	53	1000	100	120
1998	29	633	8.1	53	1000	100	115
1998	29	648	8.6	53	1001	100	107
1998	29	703	7.7	53	1001	100	118
1998	29	718	8.2	53	1001	100	105
1998	29	733	6.6	53	1002	100	102
1998	29	748	7.3	53	1002	100	114
1998	29	803	5.2	53	1002	100	132
1998	29	818	7.4	54	1002	100	126
1998	29	833	9.5	54	1003	100	121
1998	29	848	12.1	53	1003	100	101
1998	29	903	8.6	53	1003	100	131
1998	29	918	1.8	53	1003	100	143

**Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	29	933	5.5	53	1003	100	83
1998	29	948	7.9	52	1003	100	80
1998	29	1003	8.4	53	1003	100	99
1998	29	1018	8.1	54	1003	100	101
1998	29	1033	6.7	55	1003	100	108
1998	29	1048	6.0	56	1003	100	124
1998	29	1103	5.9	56	1003	100	122
1998	29	1118	6.9	56	1003	100	117
1998	29	1133	6.6	56	1003	100	121
1998	29	1148	7.9	58	1003	97	122
1998	29	1203	4.8	58	1003	98	112
1998	29	1218	5.5	59	1003	94	109
1998	29	1233	4.9	59	1002	92	87
1998	29	1248	5.3	60	1002	87	176
1998	29	1303	17.3	54	1003	80	282
1998	29	1318	15.3	49	1004	92	319
1998	29	1333	10.1	48	1003	99	126
1998	29	1348	10.6	49	1003	100	43
1998	29	1403	9.7	50	1003	100	31
1998	29	1418	8.9	52	1003	99	44
1998	29	1433	9.2	53	1003	95	34
1998	29	1448	7.6	54	1003	90	32
1998	29	1503	9.0	54	1004	86	34
1998	29	1518	8.0	55	1004	82	43
1998	29	1533	7.5	55	1004	79	58
1998	29	1548	6.9	56	1004	76	58
1998	29	1603	4.8	56	1004	76	73
1998	29	1618	4.4	56	1004	75	95
1998	29	1633	3.5	55	1005	75	99
1998	29	1648	2.5	55	1005	76	98
1998	29	1703	2.6	54	1005	78	102
1998	29	1718	0.0	54	1005	81	114
1998	29	1733	0.3	52	1005	83	118
1998	29	1748	0.0	52	1005	87	133
1998	29	1803	0.0	51	1005	91	198
1998	29	1818	0.0	50	1006	95	229
1998	29	1833	0.0	49	1006	97	250
1998	29	1848	1.0	49	1006	99	247
1998	29	1903	1.1	50	1006	98	238
1998	29	1918	1.9	49	1006	98	230
1998	29	1933	0.7	49	1006	98	233
1998	29	1948	0.1	49	1006	98	243
1998	29	2003	0.3	49	1007	99	253

# **Diazinon Application Meteorological Data (15 minute averages)**

Year	Julian Day	Time	Wind Speed (mph)	Temp. (F)	Barometric Pressure (hPa)	Relative Humidity	Wind Direction (degrees from geo. N)
1998	29	2018	2.5	49	1007	100	249
1998	29	2033	0.3	49	1007	99	241
1998	29	2048	0.1	48	1007	100	220
1998	29	2103	0.0	48	1007	100	215
1998	29	2118	0.3	47	1007	100	89
1998	29	2133	0.0	47	1007	100	61
1998	29	2148	0.2	45	1007	100	72
1998	29	2203	0.0	46	1007	100	72
1998	29	2218	0.0	44	1007	100	100
1998	29	2233	0.0	44	1007	100	136
1998	29	2248	0.0	44	1007	100	122
1998	29	2303	0.5	43	1007	100	94
1998	29	2318	3.3	44	1007	100	94
1998	29	2333	0.4	44	1007	100	103
1998	29	2348	0.0	43	1007	100	137
1998	30	3	0.0	43	1007	100	119
1998	30	18	0.0	43	1007	100	97
1998	30	33	0.0	42	1007	100	62
1998	30	48	0.0	42	1007	100	75
1998	30	103	0.0	41	1007	100	73
1998	30	118	0.0	41	1007	100	88
1998	30	133	0.0	41	1007	100	96
1998	30	148	1.2	41	1007	100	79
1998	30	203	1.1	42	1007	100	78
1998	30	218	1.9	42	1007	100	87
1998	30	233	2.3	42	1007	100	92
1998	30	248	2.0	42	1007	100	96
1998	30	303	0.0	41	1007	100	104
1998	30	318	0.0	41	1007	100	138
1998	30	333	0.0	40	1006	100	158
1998	30	348	0.0	40	1006	100	202
1998	30	403	0.0	39	1006	100	214
1998	30	418	0.0	39	1007	100	40
1998	30	433	0.0	38	1007	100	95
1998	30	448	0.0	38	1007	100	100
1998	30	503	0.0	38	1007	100	127
1998	30	518	0.0	38	1006	100	112
1998	30	533	0.0	38	1006	100	145
1998	30	548	0.0	39	1006	100	166
1998	30	603	0.0	38	1006	100	174
1998	30	618	0.0	38	1006	100	124
1998	30	633	0.0	37	1006	100	143
1998	30	648	0.0	37	1006	100	168

**Diazinon Application Meteorological Data (15 minute averages)**

<b>Year</b>	<b>Julian Day</b>	<b>Time</b>	<b>Wind Speed (mph)</b>	<b>Temp. (F)</b>	<b>Barometric Pressure (hPa)</b>	<b>Relative Humidity</b>	<b>Wind Direction (degrees from geo. N)</b>
1998	30	703	0.0	37	1006	100	175
1998	30	718	0.0	37	1006	100	195
1998	30	733	0.0	37	1006	100	198
1998	30	748	0.0	37	1007	100	191
1998	30	803	0.0	38	1007	100	64
1998	30	818	0.0	38	1007	100	41
1998	30	833	0.2	38	1007	100	53
1998	30	848	1.1	40	1007	100	82
1998	30	903	4.0	40	1007	100	89
1998	30	918	3.3	42	1007	100	79
1998	30	933	2.4	43	1007	100	85
1998	30	948	2.7	45	1007	100	87
1998	30	1003	1.9	47	1007	100	84
1998	30	1018	0.8	48	1007	100	69
1998	30	1033	0.4	50	1007	100	92
1998	40	1510	0.2	7	930	40	38
1998	40	1525	0.0	62	1019	56	47